Statement of Basis
Concrete Batch Plant General Permit

Permit to Construct No. P-2017.0059
Project ID 61971

P. W. Feenstra Construction, Inc. - 00580
Portable

Facility ID 777-00580

Final

February 7, 2018
Will Tiedemann
Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
BMP	best management practices
Btu	British thermal units
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CBP	concrete batch plant
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hr/yr	hours per consecutive 12 calendar month period
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PERF	Portable Equipment Relocation Form
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million

ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_X	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TEQ	toxicity equivalent
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

P. W. Feenstra Construction, Inc. - 00580 has proposed a new portable, truck mix concrete batch plant consisting of aggregate stockpiles, a cement storage silo, a cement supplement (fly ash) storage silo, a weigh batcher, and conveyors. The facility combines aggregate, sand, fly ash, and cement and then transfers the mixture into a truck mixer, along with water, for in-transit mixing of the concrete.

The concrete batch plant will be fed a mixture of aggregates from imported aggregate

The process begins with materials being fed via front end loader to a compartment bin feeder system and then dispensed in metered proportions to a collecting conveyor. The material will pass over a scalping screen before being conveyed into the truck mixer.

Particulate emissions will be controlled by use of all reasonable precautions.

The Applicant has proposed concrete production rate throughput limits of 2,000 cubic yards per day, and 30,000 cubic yards per year.

The Applicant has proposed that line power will be used exclusively at the facility. Therefore, no IC engines powering electrical generators were included in the application.

Permitting History

This is the initial PTC for a new facility thus there is no permitting history.

Application Scope

This is the initial PTC for a new facility.

Application Chronology

December 12, 2017	DEQ received an application and an application and processing fee.
Dec. 18, 2017 – Jan. 2, 2019	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
December 14, 2017	DEQ determined that the application was complete.
January 30, 2018	DEQ made available the draft permit and statement of basis for peer and regional office review.
February 7, 2018	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
Materials Handling	Material Transfer Points: Materials handling Concrete aggregate transfers Truck unloading of aggregate Aggregate conveyor transfers Aggregate handling	Use of all reasonable precautions	N/A
Concrete Mixer	Concrete Batch Plant – Truck Manufacturer: Concrete Equipment Co. Model: 327D Manufacture Date: Oct. 2017 Max. production: 150 yd^3/hr, 2000 yd^3/day, and 30000 yd^3/yr Cement Storage Silo: Storage capacity: N/A Bin Vent Filter/Baghouse Manufacturer[a]: Concrete Equipment Co. Model: PJC-32 Second Cement Storage Silo: Storage capacity: N/A Bin Vent Filter/Baghouse Manufacturer[a]: Concrete Equipment Co. Model: PJC-300S Fly Ash Storage Silo: Storage capacity: N/A Bin Vent Filter/Baghouse Manufacturer[a]: Concrete Equipment Co. Model: PJC-300S	Truck Load-out Shroud $PM_{10}/PM_{2.5}$ control efficiency: 75% Material Transfer Points: $PM_{10}/PM_{2.5}$ control efficiency: 75% Weigh Batcher Baghouse: Manufacturer: Concrete Equipment Co. Model: PJC-32 $PM_{10}/PM_{2.5}$ control efficiency: 99.9% Cement Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Concrete Equipment Co. Model: PJC-300S $PM_{10}/PM_{2.5}$ control efficiency: 99.9% Second Cement Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Concrete Equipment Co. Model: PJC-300S $PM_{10}/PM_{2.5}$ control efficiency: 99.9% Fly Ash Storage Silo Bin Vent Filter/Baghouse: Manufacturer: Concrete Equipment Co. Model: PJC-300S $PM_{10}/PM_{2.5}$ control efficiency: 99.9%	Weigh Batcher Baghouse Exhaust: Exit height: 18 ft (5.5m) Exit diameter: 6 in (15.2 cm) Exit flow rate: 162 acfm Exit temperature: N/A °F Cement Storage Silo Bin Vent Filter/Baghouse Exhaust: Exit height: 21 ft (6.4 m) Exit diameter: 11.5 in (29.2 cm) Exit flow rate: 1000 acfm Exit temperature: N/A °F Second Cement Storage Silo Bin Vent Filter/Baghouse Exhaust Exit height: 42 ft (12.8 m) Exit diameter: 11.5 in (29.2 cm) Exit flow rate: 1500 acfm Exit temperature: N/A °F Fly Ash Storage Silo Bin Vent Filter/Baghouse Exhaust: Exit height: 21 ft (6.4 m) Exit diameter: 11.5 in (29.2 cm) Exit flow rate: 1000 acfm Exit temperature: NA °F (XX °C)

a) Both the storage silo baghouse and supplement storage silo fly ash baghouse are considered process equipment and therefore there is no associated control efficiency. Controlled PM_{10} emission factors were used when determining PTE and for modeling purposes.

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit an emission inventory was developed for the concrete batch plant operations at the facility associated with this proposed project using the DEQ developed CBP EI spreadsheet (see Appendix A). Emissions estimates of criteria pollutant PTE were based on the following assumptions:

- Maximum concrete throughput does not exceed 150 yd^3/hr, 2,000 yd^3/day, and 30,000 yd^3/year (per the Applicant).
- Baghouse filter control efficiencies were assumed to be 99.0%.
- Fugitive emissions of particulate matter (PM), PM_{10}, and $PM_{2.5}$ from the concrete batch plant material transfer points were assumed to be controlled by manual water sprays, sprinklers, or spray bars, or an equivalent method that reduce PM emissions by an estimated 75%. The assumed 75% control efficiency is based on the Western Regional Air Partnership Fugitive Dust Handbook. According to the Handbook, water suppressant of material handling can range from 50-90% control. Assuming the average of 70% and including another 5% due to Best Management Practices required by the permit allow for 75% control to be a conservative estimate.
- Aggregate is washed before delivery to the concrete batch plant site, and water is used on-site to control the temperature of the aggregate. Particulate matter and PM_{10} emissions from the weigh batcher transfer point are controlled by a baghouse filter, and truck mix load-out emissions are controlled by a shroud. Capture efficiency of the weigh batcher baghouse or equivalent was estimated at 99%. Control efficiency of the truck mix load-out shroud was estimated at 75%
- Controlled emissions of particulate toxic air pollutants (TAPs) were estimated based on the presence of bin vent filters/baghouse controlling emissions from the cement/cement supplement silos, a baghouse controlling emissions from the weigh batcher, and 75% control for truck load-out emissions. Hexavalent chromium content was estimated at 20% of total chromium for cement, and 30% of total chromium for the cement supplement/fly ash. The hexavalent chromium percentages were taken from a University of North Dakota study, by the Energy and Environmental Research Center, Center for Air Toxic Metals. Detailed emissions calculations can be found in Appendix A of this document.
- Determining emissions from a concrete batch plant also includes transfer emissions from the number of drop points throughout the process. The PM_{10} emissions from truck-mix loading operations are defined by an equation which includes the wind speed at each drop point and the moisture content of cement and cement supplement and a number of exponents and constants defined by AP-42 Equation 11.12-1 (6/06). An average value of wind speed and moisture content are 7 mph, 4.17%, and 1.77%, respectively[1]. The following equation of particulate emissions is specific to PM_{10}. The resulting emissions were used to determine a factor to help evaluate wind speed variations in AERMOD modeling.

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[1] 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006. This data is from the Western Regional Climate Center (http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO). 4.17 % and 1.77% were the average percentages for sand and aggregate respectively. These values are based on EPA tests conducted at Cheney Enterprises. The percentages used in AP-42 are typical for most concrete batching operations.

$$E = k(0.0032) * \left[\frac{U^a}{M^b} \right] + c$$

Where:
k = particle size multiplier
a = exponent
b = exponent
c = constant
U = mean wind speed
M = moisture content

- The second transfer emissions calculations were used to determine conveyor emissions. For both coarse and fine aggregate to a conveyor. It was assumed that 82%, which for this facility is 150 yd^3/hr (0.82 x 123 yd^3/hr), of the concrete produced was aggregate. This percentage was based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete as defined by AP-42 Table 11.12-5 (06/06). The fine and coarse aggregate contributions were separated into 36% and 46% of the total concrete production[2]. Employing emission factors from AP-42 Table 11.12-5 (6/06) for conveyor transfer and assuming 75% control efficiency as stated earlier for conveyor transfer PM_{10} emissions were calculated for each transfer point. For both fine and coarse aggregate the facility has 1 transfer point.
- Any emissions unit outside a 1,000 ft radius from the concrete batch plant was not included in the emissions modeling analysis for this project.

Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

The following table presents the uncontrolled Potential to Emit for regulated air pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this operation uncontrolled Potential to Emit is calculated with 0% control efficiency for the Concrete Batch Plant itself.

Table 2 UNCONTROLLED POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC
	T/yr	T/yr	T/yr	T/yr	T/yr
			Point Sources		
Concrete batch plant	2.77	0.00	0.00	0.00	0.00
Materials handling[(a)]	7.49	0.00	0.00	0.00	0.00
Total, Point Sources	**2.77**	**0.00**	**0.00**	**0.00**	**0.00**

a) Although presented here for reference, $PM_{10}/PM_{2.5}$ emissions from materials handling are considered "fugitive emissions" and therefore are not included in the "Total, Point Sources" Potential to Emit.

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[2] The percentages of coarse and fine aggregate are based on the AP-42 concrete composition. One cubic yard of concrete as defined by AP-42 is 4024 total pounds. Similarly, coarse aggregate is 1865 pounds or 46% of the total and sand (fine) aggregate is 1428 pounds or 36%.

The following table presents the uncontrolled Potential to Emit for HAP pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations and the assumptions used to determine emissions for each emissions unit. For this operation uncontrolled Potential to Emit is calculated with 0% control efficiency for the Concrete Batch Plant itself.

Table 3 UNCONTROLLED POTENTIAL TO EMIT FOR HAZARDOUS AIR POLLUTANTS

IDAPA Listing	Hazardous Air Pollutants	PTE (T/yr)
585	Chromium metal (II and III)	2.29E-03
	Manganese as Mn (fume)	1.14E-02
	Phosphorous	9.10E-03
	Selenium	4.87E-04
586	Arsenic	2.29E-03
	Beryllium and compounds	4.75E-05
	Cadmium and compounds	4.41E-05
	Chromium (VI)	4.6E-04
	Nickel	2.27E-03
	Total	**0.0284**

Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

This is a new facility. Therefore, pre-project emissions are set to zero for all criteria pollutants.

Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria and GHG pollutants from all emissions units at the facility as determined by DEQ staff using the DEQ Concrete Batch Plant EI spreadsheet. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 4 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)	lb/hr(a)	T/yr(b)
Concrete batch plant	1.77	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials handling(c)	1.71	7.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**1.77**	**0.023**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.
c) Although presented here for reference, $PM_{10}/PM_{2.5}$ emissions from materials handling are considered "fugitive emissions" and therefore are not included in the "Post Project Totals" Potential to Emit.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 5 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Potential to Emit	1.77	0.023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Changes in Potential to Emit	**1.77**	**0.023**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Non-Carcinogenic TAP Emissions

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Chromium metal (II and III)	0.0	9.25E-05	9.25E-05	**0.033**	No
Manganese as Mn (fume)	0.0	3.67E-04	3.67E-04	**0.067**	No
Phosphorous	0.0	2.98E-04	2.98E-04	**0.007**	No
Selenium	0.0	1.56E-05	1.56E-05	**0.013**	No

None of the PTEs for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Carcinogenic TAP Emissions

Pre- and post-project, as well as the change in, carcinogenic TAP emissions are presented in the following table:

Table 7 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Arsenic	0.0	3.07E-06	3.07E-06	1.5E-06	Yes
Beryllium and compounds	0.0	7.06E-08	7.06E-08	2.8E-05	No
Cadmium and compounds	0.0	2.05E-07	2.05E-07	3.7E-06	No
Chromium (VI)	0.0	6.37E-07	6.37E-07	5.6E-07	Yes
Nickel	0.0	3.19E-06	3.19E-06	2.7E-05	No

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

Some of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for arsenic and chromium (VI) because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 8 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

IDAPA Listing	Hazardous Air Pollutants	PTE (T/yr)
585	Chromium metal (II and III)	1.28E-05
	Manganese as Mn (fume)	6.53E-05
	Phosphorous	4.25E-05
	Selenium	2.81E-06
586	Arsenic	1.35E-05
	Beryllium and compounds	3.09E-07
	Cadmium and compounds	8.98E-07
	Chromium (VI)	2.79E-06
	Nickel	1.40E-05
	Total	**0.0002**

The estimated PTE for all federally listed HAPs combined is below 25 T/yr and no PTE for a federally listed HAP exceeds 10 T/yr. Therefore, this facility is not a Major Source for HAPs.

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of two HAPs/TAPs (Arsenic and Chromium VI) from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[3]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

An ambient air quality impact analysis document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

As a result of the ambient air quality impact analysis, as well as information submitted by the Applicant for specific operating scenarios, the following conditions (along with corresponding monitoring and record keeping requirements) were placed in the permit:

- The Emissions Limits permit condition,
- The Concrete Production Limits permit condition,
- The Concrete Operation Setback Distance Requirements permit condition,
- The Relocation Requirement permit condition.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

This modeling analysis for this facility demonstrates compliance with applicable standards in attainment areas. However, because a separate modeling analysis was not provided to demonstrate compliance with applicable standards in non-attainment areas, this portable facility is not permitted for operation in non-attainment areas. This requirement is assured by Permit Condition 2.6

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[3] Criteria pollutant thresholds in Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, rev. 1, December 31, 2002.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For THAPs (Total Hazardous Air Pollutants) Only:

A = Use when any one HAP has actual or potential emissions $\geq$ 10 T/yr or if the aggregate of all HAPS (Total HAPs) has actual or potential emissions $\geq$ 25 T/yr.

SM80 = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the permit sets limits $\geq$ 8 T/yr of a single HAP or $\geq$ 20 T/yr of THAP.

SM = Use if a synthetic minor (potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable limitations) and the potential HAP emissions are limited to < 8 T/yr of a single HAP and/or < 20 T/yr of THAP.

B = Use when the potential to emit without permit restrictions is below the 10 and 25 T/yr major source threshold

UNK = Class is unknown

For All Other Pollutants:

A = Actual or potential emissions of a pollutant are $\geq$ 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are $\geq$ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (potential emissions fall below 100 T/yr if and only if the source complies with federally enforceable limitations) and potential emissions of the pollutant are < 80 T/yr.

B = Actual and potential emissions are < 100 T/yr without permit restrictions.

UNK = Class is unknown.

Table 9 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Uncontrolled PTE (T/yr)	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
$PM_{10}/PM_{2.5}$	2.77	0.023	**100**	B
SO_2	0.0	0.0	**100**	B
NO_X	0.0	0.0	**100**	B
CO	0.0	0.0	**100**	B
VOC	0.0	0.0	**100**	B
HAP (single)	1.14E-02	NA	**10**	B
HAP (Total)	0.0284	NA	**25**	B

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the proposed new emissions source emissions source. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Registration Procedures and Requirements for Portable Equipment (IDAPA 58.01.01.500)

IDAPA 58.01.01.500	Registration Procedures and Requirements for Portable Equipment

Section 01 requires that all existing portable equipment shall be registered within ninety (90) days after the original effective date of this Section 500 and at least ten (10) days prior to relocating, using forms provided by the Department, except that no registration is required for mobile internal combustion engines, marine installations and locomotives. This requirement is assured by Permit Condition 2.4.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.624	Visible Emissions

The sources of PM_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 3.4.

Fugitive Emissions (IDAPA 58.01.01.650)

IDAPA 58.01.01.650	Rules for the Control of Fugitive Emissions

The sources of fugitive emissions at this facility are subject to the State of Idaho fugitive emissions standards. These requirements are assured by Permit Conditions 2.1, 2.2, and 2.8.

Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)

IDAPA 58.01.01.701	Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 and IDAPA 58.01.01.702 establish PM emission limits for equipment that commenced operation on or after October 1, 1979 and for equipment operating prior to October 1, 1979, respectively.

For equipment that commenced operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following four equations:

IDAPA 58.01.01.701.01.a: If PW is $< 9{,}250$ lb/hr; $E = 0.045\ (PW)^{0.60}$

IDAPA 58.01.01.701.01.b: If PW is $\geq 9{,}250$ lb/hr; $E = 1.10\ (PW)^{0.25}$

For equipment that commenced prior to October 1, 1979, the PM allowable emission rate is based on one of the following equations:

IDAPA 58.01.01.702.01.a: If PW is $< 17{,}000$ lb/hr; $E = 0.045\ (PW)^{0.60}$

IDAPA 58.01.01.702.01.b: If PW is $\geq 17{,}000$ lb/hr; $E = 1.12\ (PW)^{0.27}$

As discussed previously in the Emissions Inventory Section, concrete has a density of 4,024 lb per cubic yard. Thus, for the new Concrete Batch Plant proposed to be installed as a result of this project with a proposed throughput of 150 y^3/hr, E is calculated as follows:

Proposed throughput = 4,024 lb per cubic yard x 150 y^3/hr = 603,600 lb/hr

Therefore, E is calculated as:

$E = 1.10 \times PW^{0.25} = 1.10 \times (603{,}600)^{0.25} = 30.66$ lb-PM/hr

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for this emissions unit is 1.77 lb-PM_{10}/hr. Assuming PM is 50% PM_{10} means that PM emissions will be 3.54 lb-PM/hr (1.77 lb-PM_{10}/hr ÷ 0.5 lb-PM_{10}/lb-PM). Therefore, compliance with this requirement has been demonstrated.

Rules for Control of Odors (IDAPA 58.01.01.775)

IDAPA 58.01.01.750 Rules for Control of Odors

Section 776.01 states that no person shall allow, suffer, cause, or permit the emission of odorous gases, liquids, or solids into the atmosphere in such quantities as to cause air pollution. These requirements are assured by Permit Conditions 2.7 and 2.10.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for all criteria pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is not subject to any NSPS requirements 40 CFR Part 60.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT Applicability (40 CFR 63)

The facility is not subject to any MACT requirements 40 CFR Part 60.

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Permit condition 1.1 establishes the permit to construct scope.

Permit condition, Table 1.1, provides a description of the purpose of the permit and the regulated sources, the process, and the control devices used at the facility.

FACILITY-WIDE CONDITIONS

As discussed previously, permit condition 2.1 establishes that the permittee shall take all reasonable precautions to prevent fugitive particulate matter (PM) from becoming airborne and provides examples of the controls in accordance with IDAPA 58.01.01.650-651.

As discussed previously, permit condition 2.2 establishes that the concrete batch plant shall employ efficient fugitive dust controls and provides examples of the controls in accordance with IDAPA 58.01.01.808.01 and 808.02.

Permit condition 2.3 establishes that the concrete batch plant shall not collocate with a rock crushing plant, any other concrete batch plant, or a concrete batch plant as requested by the Applicant.

As discussed previously, permit condition 2.4 establishes that the permittee notify DEQ when the permitted portable equipment is relocated. This requirement is based upon imposing reasonable permit conditions for portable concrete batch plants.

Permit condition 2.5 establishes that the permittee shall relocate the concrete batch plant equipment to a new pit or storage area once every 12 months. This requirement was requested by the Applicant because this is how the plant will normally be operated and because it allowed the set-back distances, required through the Ambient Air Quality Analysis, to be less than what would be required if more than one year of operation at a site was requested.

Permit condition 2.6 establishes a restriction on locating the portable concrete batch plant to non-attainment areas. The location restrictions are based upon parameters used during the ambient air quality modeling analysis performed for this project.

As discussed previously, permit condition 2.7 establishes that there are to be no emissions of odorous gases, liquids, or solids from the permit equipment into the atmosphere in such quantities that cause air pollution.

As discussed previously, permit condition 2.8 establishes that the permittee shall monitor fugitive dust emissions on a daily basis to demonstrate compliance with the facility-wide permit requirements.

Permit condition 2.9 establishes that the permittee record the date and location of the concrete batch plant each time it is relocated to demonstrate compliance with the Relocation Restriction permit condition.

As discussed previously, permit condition 2.10 establishes that the permittee monitor and record odor complaints to demonstrate compliance with the facility-wide permit requirements.

Permit Condition 2.11 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

CONCRETE BATCH PLANT EQUIPMENT

Permit condition 3.1 provides a process description of the concrete production process at this facility.

Permit condition 3.2 provides a description of the control devices used on the concrete production equipment at this facility.

Permit condition 3.3 establishes hourly and annual emissions limits for $PM_{10}/PM_{2.5}$ emissions from the concrete production operation at this facility.

As discussed previously, Permit Condition 3.4 establishes a 20% opacity limit for the concrete batch plant baghouse and the boiler stacks or functionally equivalent openings associated with the concrete production operation.

Permit Condition 3.5 establishes a daily and an annual concrete production limit for the concrete production operation as proposed by the Applicant.

Permit condition 3.6 establishes setback distance restrictions for the concrete production operation. The setback distance restrictions are based upon the results of the Ambient Air Quality Modeling Analysis performed for this project.

Permit condition 3.7 requires that the Applicant employ a baghouse filter to control emissions from the weigh batcher as proposed by the Applicant.

Permit condition 3.8 requires that the Applicant employ a shroud to control emissions from the truck loadout operation as proposed by the Applicant.

Permit condition 3.9 requires that the Applicant employ a baghouse filter to control emissions from all cement storage silos, as proposed by the Applicant.

Permit condition 3.10 requires that the Applicant employ a baghouse filter to control emissions from the fly ash storage silo, as proposed by the Applicant.

Permit condition 3.11 establishes that the Permittee monitor and record hourly and daily concrete production to demonstrate compliance with the Concrete Production Limits permit condition.

Permit condition 3.12 establishes that the Permittee measure and record concrete production equipment setback distances to demonstrate compliance with operating permit requirements.

Permit condition 3.13 establishes that the Permittee shall establish procedures for operating the weigh batcher and cement/fly ash silo baghouses. This is a DEQ imposed standard requirement for operations using baghouses to control particulate emissions.

Permit Condition 3.14 establishes that the permittee shall maintain records as required by the Recordkeeping General Provision.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c or IDAPA 58.01.01.404.01.c. During this time, there were no comments on the application and there was not a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

APPENDIX A – EMISSIONS INVENTORIES

Data Input

1. Facility Information

Facility Name: **P. W. Feenstra Construction, Inc. - 00580**
Facility ID: **777-00580**
Permit and Project No.: **P-2017.0059 Project 61971**
Source Type: **Portable Concrete Batch Plant**
Manufacturer/Model: **Concrete Equipment Co. 327D**

2. Concrete Production Rates

Maximum Hourly Concrete Production Rate:	**150**		
Proposed Daily Concrete Production Rate:	**2,000**	cy/day	**13.33**
Proposed Maximum Annual Concrete Production Rate:	**30,000**	cy/year	hr/day

3. Daily Operating Hours

Maximum daily hours of operation for facility?	**8**

4. Concrete Batch Plant Specifications

Is the facility type a truck mix (T) or central mix (C)?	**T**
What level of PM control is used for loadout, either Truck or Central?	**75%**
What level of PM control is used for fugitive emissions?	**75%**

5. Water Heater Usage

Does this facility use a water heater?	**No**		Please selec
How many units?	**0**	**Heat Input Rating**	
What type of fuel, Diesel, Natural Gas or Propane for unit 1?	**N/A**	**0**	MMBtu/hr
If multiple units, what type of fuel, Diesel, Natural Gas or Propane for unit 2?	**N/A**	**0**	MMBtu/hr
Are you assuming continual operations throughout the year?	**No**		
Maximum annual hours of water heater operation? (If assuming continual operation, enter 8,760)	**0**		

6. Internal Combustion Engine(s)

Are internal combustion engines used to provide electrical power at the facility?	**No**
How many small engines (less than or equal to 600 bhp) are being used at the facility?	**0**
Horsepower rating of small engine #1 (<=600 bhp)? (If no engine enter 0)	**0**
Horsepower rating of small engine #2 (<=600 bhp)? (If no engine enter 0)	**0**
Horsepower rating of large engine (greater than 600 bhp)? (If no engine enter 0)	**0**

Note: If there is no small or large engine enter -1 for the certification

	Small IC Engine #1	**Small IC Engine #2**	**Large IC Engine**
Select the EPA Certification:	**-1**	**-1**	**-1**
Not an EPA-certified IC engine: Enter "0" (zero)			
Certified Tier I, Tier 2, Tier 3, or Tier 4 IC engine: Enter 1, 2, 3, or 4			
Certified "BLUE SKY" IC engine: Enter 5			

Enter the annual operating hours for the small IC engine(s)	**0**
Enter the annual operating hours for the large IC engine	**0**

7. Transfer Points

Enter the total number of transfer points in the facility? (2 is the default)	**1**

CRITERIA POLLUTANT EMISSION INVENTORY for Portable Concrete Batch Plant

Facility Information

2/7/18 9:06

Company:	P. W. Feenstra Construction, Inc. - 00580
Facility ID:	777-00580
Permit and Project No.:	P-2017.0059 Project 61971
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	Concrete Equipment Co. 3270

Assumptions Implied or Stated in Application:

See control assumptions

Truck Mix (T) or Central Mix (C) T

Production Rates[1]

Maximum Hourly Production Rate	150	cy/hr		Per manufacturer
Proposed Daily Production Rate	2,000	cy/day	13.33	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate	30,000	cy/year		
Cement Storage Silo Capacity	4540	ft^3 of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only	65%	of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash	35%	of the silo capacity		

PM$_{10}$ Emissions due to this PTC

Emissions Point	PM$_{2.5}$ Emission Factor[1] (lb/cy)		PM$_{10}$ Emission Factor[2] (lb/cy)		Controlled Emission Rate PM$_{2.5}$, Max	Controlled Emission Rate PM$_{10}$, Max	Controlled Emission Rate PM$_{2.5}$, 24-hour average		Controlled Emission Rate PM$_{10}$, 24-hour average		Controlled Emission Rate PM$_{2.5}$, annual average		Controlled Emission Rate PM$_{10}$, annual average			
	Controlled	Uncontrolled	Controlled	Uncontrolled	lb/hr[3]	lb/hr[3]	lb/hr[4]	lb/day[4]	lb/hr[4]	lb/day[4]	lb/hr[5]	T/yr[5]	lb/hr[5]	T/yr[5]	**Control Assumptions:**	
Aggregate delivery to ground storage		0.00096		0.0031	0.04	0.12	0.02	0.48	0.065	1.55	8.22E-04	3.60E-03	0.003	0.012	**75%**	Water Sprays at Operator's Discretion
Sand delivery to ground storage		0.000225		0.0007	0.01	0.03	4.69E-03	0.11	0.015	0.35	1.93E-04	8.44E-04	0.001	0.003	**75%**	Water Sprays at Operator's Discretion
Aggregate transfer to conveyor		0.00096		0.0031	0.04	0.12	0.02	0.48	0.065	1.55	8.22E-04	3.60E-03	0.003	0.012	**75%**	Water Sprays at Operator's Discretion
Sand transfer to conveyor		0.000225		0.0007	0.01	0.03	4.69E-03	0.11	0.015	0.35	1.93E-04	8.44E-04	0.001	0.003	**75%**	Water Sprays at Operator's Discretion
Aggregate transfer to elevated storage		0.00096		0.0031	0.04	0.12	0.02	0.48	0.065	1.55	8.22E-04	3.60E-03	0.003	0.012	**75%**	Water Sprays at Operator's Discretion
Sand transfer to elevated storage		0.000225		0.0007	0.01	0.03	4.69E-03	0.11	0.015	0.35	1.93E-04	8.44E-04	0.001	0.003	**75%**	Water Sprays at Operator's Discretion
Cement delivery to Silo (controlled EF)	**0.00003**		**0.0001**		4.50E-03	1.25E-02	**2.50E-03**	6.00E-02	**6.95E-03**	1.67E-01	1.03E-04	4.50E-04	2.86E-04	**1.25E-03**	**0.00%**	Baghouse is process equipment, use controlled EF
Cement supplement delivery to Silo (controlled EF)	**0.000045**		**0.0002**		6.75E-03	2.68E-02	**3.75E-03**	9.00E-02	**1.49E-02**	3.58E-01	1.54E-04	6.75E-04	6.12E-04	**2.68E-03**	**0.00%**	Baghouse is process equipment, use controlled EF
Weigh hopper loading (sand & aggregate batcher loading)		**0.001185**		**0.00395**	1.78E-03	5.93E-03	**9.88E-04**	2.37E-02	**3.29E-03**	7.90E-02	4.06E-05	1.78E-04	1.35E-04	**5.93E-04**	99.0%	Sealed boot (vents back to silo) or baghouse
Truck mix loading, Table 11.12-2, "0.310 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/ 2000 lb = 0.0874 lb/cy. PM2.5 was calculated as 15% of PM: "1.118 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)*0.15/ 2000 lb = 0.0473 lb/cy		**0.0473**		**0.07874**	1.77E+00	2.95	**0.99**	23.65	**1.84**	39.37	4.05E-02	1.77E-01	0.07	**0.30**	**75.0%**	Boot, enclosure, or equivalent or baghouse or boot w/water ring
Central mix loading, Table 11.12-2, "0.156 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)/ 2000 lb = 0.0440 lb/cy. PM2.5 was calculated as 15% of PM: "0.572 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete)*0.15/ 2000 lb = 0.0242 lb/cy		**0.0000**		**0.0000**	0.00E+00	0.00	**0.00**	0.00	**0.00**	0.00	0.00E+00	0.00E+00	0.00	**0.00**	**75.0%**	Baghouse control
Point Sources Total Emissions		**4.86E-02**		**8.30E-02**	**1.79E+00**	**3.00E+00**	**9.93E-01**	**2.38E+01**	**1.67E+00**	**4.00E+01**	**2.97E-04**	**1.30E-03**	**1.03E-03**	**4.53E-03**		
Process Fugitive Emissions		0.003555		0.0114	0.13	0.43	0.07	1.78	0.24	5.71	0.00	0.01	0.01	0.04		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)				0.0944		3.43	1.07	25.60	1.90	45.68			0.01	0.05		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		**Controlled EF**	**at 1,314,000 cy/yr**	**T/yr**	(controlled PTE @ 8,760)
Facility Classification Total PM[6]		**8.40E-03**		**5.52E+00**	
Facility Classification Total PM10[5,8]		**4.21E-03**		**2.77E+00**	

Materials Handling Uncontrolled PTE 7.4974869

[1] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-5, and a percentage of PM that is considered to be PM$_{2.5}$. The percentage used to establish the EFs were based on AP-42, Appendix B, Table B-2.2, Category 3. It was established that the fraction that is PM$_{2.5}$ is 15%. Note that the aggregate and sand handling are static EF's in this spreadsheet, but varies during modeling as the wind speed changes each hour.

[2] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, typical composition per cubic yard of concrete (1865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4024 lb/cy), and closely match Table 11.12-5 values (version 6/06) when rounded to the same number of figures. AP-42 lists the same EFs for uncontrolled and controlled emissions, so control estimates are based on the assumed control levels input on the right hand side of the table.

[3] Max. hourly rate includes reductions associated with control assumptions

[4] Hourly emissions rate (24-hr average) = Max hourly emissions rate x (hrs per day) / 24.
Daily emissions rate = max emissions rate (1-hr average) x proposed hrs/day.

[5] Annual average hourly emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) / (8760 hr/yr)
Annual emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) /(2000 lb/T)

[6] Controlled EFs for PM = 0.0002 (cement silo) + 0.0003 (flyash silo) +0.0079(weigh batcher)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) +0.0040 (weigh batcher)

[7] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 3,600 cy/day, and 1,314,000 cy/yr

[8] Emissions for Facility Classification do not include truck mix loading emissions; this is typically considered a fugitive emission source for concrete batch plants.

Lead emissions			Increase in Emissions from this PTC				Emissions for Facility Classification	
Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly		
	Controlled with fabric	Uncontrolled	lb/hr, 1-hr avg[2]	lb/month[3]	T/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo[2]	**1.09E-08**	[illegible]	4.01E-07	1.63E-04	8.03E-05	2.23E-07	Point Source	1.76E-06
Cement supplement delivery to Silo[3]	**5.20E-07**	[illegible]	2.85E-06	1.15E-03	5.69E-04	1.58E-06	Point Source	1.25E-05
Truck Loadout (with 99.9% control)[5]		**3.62E-06**	3.83E-05	1.55E-02	7.66E-03	2.13E-05	Fugitive	
Total			**4.15E-05**	**1.68E-02**	**0.008**		**Point Sources**	**1.42E-05**
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

[1] The emissions factors are from AP-42, Table 11.12-8 (version 06/06)
[2] Max. hourly rate = EF x pound of cement/yd^3 of concrete x max. hourly concrete production rate/(2000 lb/T)
[3] lb/mo = EF x pound of material/yd^3 of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)
[4] T/yr = EF x pound of material/yd^3 of concrete x max. annual concrete production rate/(2000 lb/T)
[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

Toxic Air Pollutant (TAPs) EMISSIONS INVENTORY, Concrete Batch Plant

2/7/2018 9:06

Facility Information

Company:	P. W. Feenstra Construction, Inc. - 00580
Facility ID:	777-00580
Permit No.:	P-2017.0059 Project 61971
Source Type:	Portable Concrete Batch Plant
Manufacturer:	Concrete Equipment Co. 327D

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate		1865	pounds
Sand		1428	pounds
Cement		491	pounds
Cement supplement		73	pounds
Water		20	gallons
Concrete		**4024**	**pounds**

Truck Mix Loadout Factor: 1

Central Mix Batching Factor: 0

DEQ EI VERIFICATION WORKSHEET Version 032007
Tip: Blue text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Concrete Production

Maximum Hourly Production Rate:	150	cy/hr	
Proposed Daily Production Rate:	2,000	cy/day	
Proposed Maximum Annual Production Rate:	30,000	cy/year	

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
3,600 cy/day	7 day/wk,
1,314,000 cy/year	52 wks/year

TAP Emission Factors from AP-42, Table 11.12-8 (Version 06/06)

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	**Percent of total Cr that is Cr+6**
Cement silo filling (with baghouse)	**4.24E-09**	1.68E-06	**4.86E-10**	1.79E-08	ND	2.34E-07	**2.90E-08**	2.52E-07	**1.17E-07**	2.02E-04	**4.18E-08**	1.76E-05	ND	**1.18E-05**	ND	ND	**20%**
Cement supplement silo filling (with baghouse)	**1.00E-06**	ND	**9.04E-08**	ND	**1.98E-10**	ND	**1.22E-06**	ND	**2.56E-07**	ND	**2.28E-06**	ND	**3.54E-06**	ND	**7.24E-08**	ND	**30%**
Truck loading (no boot or shroud)	6.02E-07	**1.22E-05**	1.04E-07	**2.44E-07**	9.06E-09	**3.42E-08**	4.10E-06	**1.14E-05**	2.08E-05	**6.12E-05**	4.76E-06	**1.19E-05**	1.23E-05	**3.84E-05**	1.13E-07	**2.62E-06**	**21.29%**
Central Mix Batching (NO boot or shroud)	0.00E+00	**0.00E+00**	ND	ND	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	0.00E+00	**0.00E+00**	ND	ND	**21.29%**

UNCONTROLLED TAP EMISSIONS

Note: Includes baghouses as process equipment. **3,600 cy/day, and 1,314,000 cy/yr**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg
Cement silo filling (with baghouse)	1.56E-07	6.84E-07	1.79E-08	7.84E-08	8.62E-06	3.77E-05	1.07E-06	4.06E-05	4.31E-06	1.89E-05	1.54E-06	6.74E-06	4.35E-04	1.90E-03	ND	ND	2.14E-07
Cement supplement silo filling (with baghouse)	5.48E-06	2.40E-05	4.95E-07	2.17E-06	1.08E-09	4.75E-09	6.68E-06	2.93E-05	1.40E-06	6.14E-06	1.25E-05	5.47E-05	1.94E-05	8.49E-05	3.96E-07	1.74E-06	2.00E-06
Truck loading (no boot or shroud)	5.16E-04	2.26E-03	1.03E-05	4.52E-05	1.45E-06	6.34E-06	4.82E-04	2.11E-03	2.59E-03	1.13E-02	5.03E-04	2.20E-03	1.62E-03	7.11E-03	1.11E-04	4.85E-04	1.03E-04
Sources Total	**5.22E-04**	2.29E-03	**1.08E-05**	4.75E-05	**1.01E-05**	4.41E-05	**4.90E-04**	2.18E-03	**2.59E-03**	1.14E-02	**5.17E-04**	2.27E-03	**2.08E-03**	9.10E-03	**1.11E-04**	4.87E-04	**1.05E-04**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	**Yes**		No		Yes		No		No		**Yes**		No		No		**Yes**

2.78E-02 **Tons per year**

CONTROLLED TAP EMISSIONS

Note: Includes baghouses as process equipment. **2,000 cy/day, and 30,000 cy/year**

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg
Cement silo filling (with baghouse)[1]	3.56E-09	1.56E-08	4.09E-10	1.79E-09	1.97E-07	8.62E-07	5.93E-07	1.07E-07	2.39E-06	4.31E-07	3.51E-08	1.54E-07	ND	ND	ND	ND	4.88E-09
Cement supplement silo filling (with baghouse)[2]	1.25E-07	5.48E-07	1.13E-08	4.95E-08	2.48E-11	1.08E-10	2.50E-05	6.68E-07	5.24E-06	1.40E-07	2.85E-07	1.25E-06	7.24E-05	1.94E-06	2.20E-07	3.96E-08	4.58E-08
Truck loading (with baghouse)	2.95E-06	1.29E-05	5.89E-08	2.58E-07	8.26E-09	3.62E-08	6.70E-05	1.21E-05	3.60E-04	6.47E-05	2.87E-06	1.26E-05	2.26E-04	4.06E-05	1.54E-05	2.77E-06	5.86E-07
Sources Total	**3.07E-06**	1.35E-05	**7.06E-08**	3.09E-07	**2.05E-07**	8.98E-07	**9.25E-05**	1.28E-05	**3.67E-04**	6.53E-05	**3.19E-06**	1.40E-05	**2.98E-04**	4.25E-05	**1.56E-05**	2.81E-06	**6.37E-07**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
Percent of EL	204.94%		0.25%		5.54%		0.28%		0.1103%		11.83%		4.26%		0.1201%		113.70%
EXCEEDS EL?	**Yes**		No		No		No		No		No		No		No		**Yes**

75.00% Boot, enclosure, or equivalent or baghouse or boot w/water ring

1.52E-04 Tons per year

[1] lb/hr, annual average = EF x pound of cement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day

[2] lb/hr, annual average = EF x pound of cement supplement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton

[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / Yd3 of concrete x daily concrete production

[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1T/2000 lb)

[5] T/yr = EF x pound of cement, or cement supplement, or cement + cement supplement x annual concrete production rate /2000 lb/ton / 2000 lb/ton

NATURAL GAS COMBUSTION, AP-42 SECTION 1.4 (7/98)

Operating Assumptions: **0** MMBtu/hr / 1,020 MMBtu/MMscf = 0.00E+00 MMscf/hr
0 hr/day
0 hr/yr

Fuel Use:
0.000 MMscf/day
0.000 MMscf/year

Criteria Air Pollutants	Emission Factor	Emissions		CBP + Boiler Emissions	Modeling Threshold		Modeling Required?	Modeling Threshold		Modeling Required?
	lb/MMscf	lb/hr	T/yr	T/yr	2002 Guidance			Case-by-Case		
NO2	100	0.00E+00	0.00E+00	0.00E+00	1	T/yr	No	7	T/yr	No
CO	84	0.00E+00	0.00E+00	0.00E+00	14	lb/hr	No	70	lb/hr	No
PM10	7.6	0.00E+00	0.00E+00	4.53E-03	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
PM2.5	7.6	0.00E+00	0.00E+00	1.30E-03						
		0.00E+00	0.00E+00							
SOx	0.6	0.00E+00	0.00E+00	0.00E+00	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
VOC	5.5	0.00E+00	0.00E+00	0.00E+00	40	T/yr	No			
Lead	0.0005	0.00E+00	0.00E+00	8.31E-03	0.6	T/yr	No			
Lead, continued			5.37E-03	lb/quarter	10	lb/mo	No			
		TOTAL	**0.00E+00**	T/yr						

Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)					Exceeds EL/ Modeling Required?
	lb/MMscf	lb/hr	T/yr	EL (lb/hr)	
PAH HAPs					
2-Methylnaphthalene	2.40E-05	**0.00E+00**	**0.00E+00**	9.10E-05	No
3-Methylchloranthrene	1.80E-06	**0.00E+00**	**0.00E+00**	2.50E-06	No
7,12-Dimethylbenz(a)anthrac	1.60E-05	0.00E+00	0.00E+00		
Acenaphthene	1.80E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Acenaphthylene	1.80E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Anthracene	2.40E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Benzo(a)anthracene	1.80E-06	**0.00E+00**	**0.00E+00**	9.10E-05	See POM
Benzo(a)pyrene	1.20E-06	**0.00E+00**	**0.00E+00**	2.00E-06	See POM
Benzo(b)fluoranthene	1.80E-06	**0.00E+00**	**0.00E+00**		See POM
Benzo(g,h,i)perylene	1.20E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Benzo(k)fluoranthene	1.80E-06	**0.00E+00**	**0.00E+00**		See POM
Chrysene	1.80E-06	**0.00E+00**	**0.00E+00**		See POM
Dibenzo(a,h)anthracene	1.20E-06	**0.00E+00**	**0.00E+00**		See POM
Dichlorobenzene	1.20E-03	**0.00E+00**	**0.00E+00**	9.10E-05	No
Fluoranthene	3.00E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Fluorene	2.80E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Indeno(1,2,3-cd)pyrene	1.80E-06	**0.00E+00**	**0.00E+00**		See POM
Naphthalene	6.10E-04	0.00E+00	0.00E+00	3.33	No
Naphthalene	6.10E-04	**0.00E+00**	**0.00E+00**	9.10E-05	No
Phenanathrene	1.70E-05	**0.00E+00**	**0.00E+00**	9.10E-05	No
Pyrene	5.00E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Polycyclic Organic Matter (POM)	7-PAH Grou	**0.00E+00**	**0.00E+00**	2.00E-06	No
Non-PAH HAPs					
Benzene	2.10E-03	**0.00E+00**	**0.00E+00**	8.00E-04	No
Formaldehyde	7.50E-02	**0.00E+00**	**0.00E+00**	5.10E-04	No
Hexane	1.80E+00	0.00E+00	0.00E+00	12	No
Toluene	3.40E-03	0.00E+00	0.00E+00	25	No
Non-HAP Organic Compounds					
Butane	2.10E+00	0.00E+00	0.00E+00		
Ethane	3.10E+00	0.00E+00	0.00E+00		
Pentane	2.60E+00	0.00E+00	0.00E+00	118	No
Propane	1.60E+00	0.00E+00	0.00E+00		
Metals (HAPs)					
Arsenic	2.00E-04	**0.00E+00**	**0.00E+00**	1.50E-06	No
Barium	4.40E-03	0.00E+00	0.00E+00	0.033	No
Beryllium	1.20E-05	**0.00E+00**	**0.00E+00**	2.80E-05	No
Cadmium	1.10E-03	**0.00E+00**	**0.00E+00**	3.70E-06	No
Chromium	1.40E-03	0.00E+00	0.00E+00	0.033	No
Cobalt	8.40E-05	0.00E+00	0.00E+00	0.0033	No
Copper	8.50E-04	0.00E+00	0.00E+00	0.013	No
Manganese	3.80E-04	0.00E+00	0.00E+00	0.067	No
Mercury	2.60E-04	0.00E+00	0.00E+00	0.003	No
Molybdenum	1.10E-03	0.00E+00	0.00E+00	0.333	No
Nickel	2.10E-03	**0.00E+00**	**0.00E+00**	2.70E-05	No
Selenium	2.40E-05	0.00E+00	0.00E+00	0.013	No
Vanadium	2.30E-03	0.00E+00	0.00E+00	0.003	No
Zinc	2.90E-02	0.00E+00	0.00E+00	0.667	No

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/YR)	0.01

DIESEL COMBUSTION, AP-42 SECTION 1.3 (9/98)

0 MMBtu/hr / 140 MMBtu/10^3 gal = 0.00E+00 10^3 gal/hr **Fuel Use:**
Operating Assumptions: **0** hr/day **0.00 gal/day**
0 hr/yr **0 gal/year**
0.0015% sulfur

Criteria Air Pollutants	**Emission Factor**	**Emissions**		**CBP + Boiler Emissions**	**Modeling Threshold**		**Modeling Required?**	**Modeling Threshold**		**Modeling Required?**
	lb/10^3 gal	**lb/hr**	**T/yr**	**T/yr**	**2002 Guidance**			**Case-by-Case**		
NO2	20	0.00E+00	0.00E+00	0.00E+00	1	T/yr	No	7	T/yr	No
CO	5	0.00E+00	0.00E+00	0.00E+00	14	lb/hr	No	70	lb/hr	No
PM10 (filterable + condensable)	3.3	0.00E+00	0.00E+00	4.53E-03	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
PM2.5 (filterable + condensable)	1.8	0.00E+00	0.00E+00	1.30E-03						
		0.00E+00	0.00E+00							
SOx (SO2 + SO3)	0.216	0.00E+00	0.00E+00	0.00E+00	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
VOC (TOC)	0.556	0.00E+00	0.00E+00	0.00E+00	40	T/yr	No			
Lead EF = 9 lb/10^{12} Btu	9	0.00E+00	0.00E+00	8.31E-03	0.6	T/yr	No			
Lead, continued			0.00E+00	lb/quarter	10	lb/mo	No			
		TOTAL	**0.00E+00**	T/yr						

Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)

Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)					**Exceeds EL/ Modeling Required?**
	lb/10^3 gal	**lb/hr**	**T/yr**	**EL (lb/hr)**	
PAH HAPs					
Acenaphthene	2.11E-05	**0.00E+00**	**0.00E+00**	9.10E-05	No
Acenaphthylene	2.57E-07	**0.00E+00**	**0.00E+00**	9.10E-05	No
Anthracene	1.22E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Benzo(a)anthracene	4.01E-06	**0.00E+00**	**0.00E+00**	9.10E-05	See POM
Benzo(a)pyrene				2.00E-06	See POM
Benzo(b,k)fluoranthene	1.48E-06	**0.00E+00**	**0.00E+00**		See POM
Benzo(g,h,i)perylene	2.26E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Benzo(k)fluoranthene	0.00E+00	**0.00E+00**	**0.00E+00**		See POM
Chrysene	2.38E-06	**0.00E+00**	**0.00E+00**		See POM
Dibenzo(a,h)anthracene	1.67E-06	**0.00E+00**	**0.00E+00**		See POM
Dichlorobenzene				9.10E-05	No
Fluoranthene	4.84E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Fluorene	4.47E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Indeno(1,2,3-cd)pyrene	2.14E-06	**0.00E+00**	**0.00E+00**		See POM
Naphthalene	1.13E-03	0.00E+00	0.00E+00	3.33	No
Naphthalene	1.13E-03	**0.00E+00**	**0.00E+00**	9.10E-05	No
Phenanathrene	1.05E-05	**0.00E+00**	**0.00E+00**	9.10E-05	No
Pyrene	4.25E-06	**0.00E+00**	**0.00E+00**	9.10E-05	No
Polycyclic Organic Matter (POM)	7-PAH Grou	**0.00E+00**	**0.00E+00**	2.00E-06	No
Non-PAH HAPs					
Benzene	2.14E-04	**0.00E+00**	**0.00E+00**	8.00E-04	No
Ethyl benzene	6.36E-05	0.00E+00	0.00E+00	2.90E+01	No
Formaldehyde	3.30E-02	**0.00E+00**	**0.00E+00**	5.10E-04	No
Hexane	1.80E+00	0.00E+00	0.00E+00	12	No
Toluene	6.20E-03	0.00E+00	0.00E+00	25	No
o-Xylene	1.09E-04			0.007	
Metals (HAPs)	**lb/10^{12} Btu**				
Arsenic	4.00E+00	**0.00E+00**	**0.00E+00**	1.50E-06	No
Barium				0.033	No
Beryllium	3.00E+00	**0.00E+00**	**0.00E+00**	2.80E-05	No
Cadmium	3.00E+00	**0.00E+00**	**0.00E+00**	3.70E-06	No
Chromium	3.00E+00	0.00E+00	0.00E+00	0.033	No
Cobalt				0.0033	No
Copper	6.00E+00	0.00E+00	0.00E+00	0.013	No
Manganese	6.00E+00	0.00E+00	0.00E+00	0.067	No
Mercury	3.00E+00	0.00E+00	0.00E+00	0.003	No
Molybdenum				0.333	No
Nickel	3.00E+00	**0.00E+00**	**0.00E+00**	2.70E-05	No
Selenium	1.50E+01	0.00E+00	0.00E+00	0.013	No
Vanadium				0.003	No
Zinc	4.00E+00	0.00E+00	0.00E+00	0.667	No

NOTE: TAPs lb/hr emissions are 24-hour averages unless shown in bold. Bold emissions are annual averages for carcinogens.

1,1,1-Trichloroethane 2.36E-04 Not a HAP (1,1,2 TCA is a HAP). Not a 585 or 586 TAP.

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/YR)	0.01

PROPANE/BUTANE COMBUSTION, AP-42 SECTION 1.5 (9/98)

Operating Assumptions:	**0** MMBtu/hr /	91.5 MMBtu/10^3 gal =	0.00E+00 10^3 gal/hr	**Fuel Use:**
		0 hr/day		**0.00 gal/day**
		0 hr/yr		**0 gal/year**

Criteria Air Pollutants	Emission Factor	Emissions		CBP + Boiler Emissions	Modeling Threshold		Modeling Required?	Modeling Threshold		Modeling Required?
	lb/10^3 gal	lb/hr	T/yr	T/yr	2002 Guidance			Case-by-Case		
NO2	15	0.00E+00	0.00E+00	0.00E+00	1	T/yr	No	7	T/yr	No
CO	8.4	0.00E+00	0.00E+00	0.00E+00	14	lb/hr	No	70	lb/hr	No
PM10 (filterable + condensable)	0.8	0.00E+00	0.00E+00	4.53E-03	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
PM2.5 (filterable + condensable)	0.8	0.00E+00	0.00E+00	1.30E-03						
		0.00E+00	0.00E+00							
SOx (SO2 + SO3)	1.479	0.00E+00	0.00E+00	0.00E+00	0.2	lb/hr	No	0.9	lb/hr	No
		0.00E+00	0.00E+00		1	T/yr	No	7	T/yr	No
VOC (TOC)	1.1	0.00E+00	0.00E+00	0.00E+00	40	T/yr	No			
Lead EF = 9 lb/10^{12} Btu	0	0.00E+00	0.00E+00	8.31E-03	0.6	T/yr	No			
Lead, continued			0.00E+00	lb/quarter	**10**	lb/mo	No			
		TOTAL	**0.00E+00**	T/yr						

Note: 100 lb/mo Pb in guidance reduced by factor of 10 based on latest Pb NAAQS (reduced in 2008 from 1.5 ug/m3 to 0.15 ug/m3)

Case-by-Case Modeling Thresholds may be used ONLY with DEQ Approval

TOTAL CBP + WATER HEATER EMISSIONS (POINT SOURCES, T/YR) 0.01

CURRENT PTC APPLICATION ESTIMATES

Do you have an internal combustion engine? **No**

Internal Combustion Engine(s) AP-42 Section 3.3 or 3.4 (diesel fueled)

		Fuel Type(s)	Generator Toggle
Generator Make/Model	**Enter Info**	#2 Fuel Oil (Diesel)	**1**
Rating of Large Engine (hp)	**0.0**	Max Sulfur weight percent (w/o)	**0.0015%**
Rating of Small Engine #1 (hp)	**0.0**		
Rating of Small Engine #2 (hp)	**0.0**		
EF OPTIONS:		**Use EFs in lb/MMBtu fuel input**	
1 hp = 0.7456999 kW	0.7457	Calculated Max Fuel Use Rate, gal/hr (Large)	0.00
Avg brake-specific fuel consumption (BSFC) = 7000 Btu/hp-hr	7000	Calculated Max Fuel Use Rate, gal/hr (small #1)	0.00
Fuel Heating Value, Btu/gal	137,030	Calculated Max Fuel Use Rate, gal/hr (small #2)	0.00
		Calculated MMBtu/hr (Large)	0.00
		Calculated MMBtu/hr (Small #1)	0.00
		Calculated MMBtu/hr (Small #2)	0.00

Note: AP-42 Tables 3.3-x,3.4-x: avg diesel heating value is based on 19,300 Btu/lb with density equal 7.1 lb/gal=> Btu/gal = 137,030

EPA Certification for Large Engine:	-1
Not EPA-certified: Enter "0" (zero)	
Certified Tier I, Tier 2, Tier 3, or Tier 4: Enter 1, 2, 3, or 4	
Certified "BLUE SKY" engine: Enter 5	

EPA Certification for Small Engine #1:	-1	**EPA Certification for Small Engine #2:**	-1
Not EPA-certified: Enter "0" (zero)		Not EPA-certified: Enter "0" (zero)	
Certified Tier I, Tier 2, Tier 3, or Tier 4: Enter 1, 2, 3, or 4		Certified Tier I, Tier 2, Tier 3, or Tier 4: Enter 1, 2, 3, or 4	
Certified "BLUE SKY" engine: Enter 5		Certified "BLUE SKY" engine: Enter 5	

Facility: **P. W. Feenstra Construction, Inc. - 00580**

2/7/2018 9:06 **Permit/Facility ID:** **Project 61971** **777-00580** User Input Weight % Sulfur = 0.0015% SO2 EF = 1.01 x S

Large Engine

Fuel Type Toggle =	0	0 hp Engine
Fuel Consumption Rate	0.00 gal/hr	
Calculated MMBtu/hr	0.0000 MMBtu/hr	
Max Daily Operation	0 hr/day	
Max Annual Operation	0 hrs/yr	

Pollutant	Emission Factor[a] (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) **Annual** or 24-hr Average
PM [b]	0.1	0.000	0.00	
PM-10 (total) [d]	0.000	0.000	0.000	
P.M.-2.5	0.000	0.000	0.000	
CO [b]	0.00	0.000	0.00	
NOx[b]	0.000	0.000	0.00	
SO_2 [b] (total SOx presum	0.001515	0.000	0.000	
VOC [b] (total TOC--> VOC	0.000	0.000	0.000	
Lead				
HCl [e]				
Dioxins[e]				
2,3,7,8-TCDD				
Total TCDD				
1,2,3,7,8-PeCDD				
Total PeCDD				
1,2,3,4,7,8-HxCDD[c]				
1,2,3,6,7,8-HxCDD				
1,2,3,7,8,9-HxCDD[c]				
Total HxCDD				
1,2,3,4,6,7,8-Hp-CDD[c]				
Total HpCDD[c]				
Octa CDD[c]				
Total PCDD[c]				
Furans[e]				
2,3,7,8-TCDF				
Total TCDF[c]				
1,2,3,7,8-PeCDF				
2,3,4,7,8-PeCDF				
Total PeCDF[c]				
1,2,3,4,7,8-HxCDF				
1,2,3,6,7,8-HxCDF				
2,3,4,6,7,8-HxCDF				
1,2,3,7,8,9-HxCDF				
Total HxCDF[c]				
1,2,3,4,6,7,8-HpCDF				
1,2,3,4,7,8,9-HpCDF				
Total HpCDF[c]				
Octa CDF[c]				
Total PCDF[c]				
Total PCDD/PCDF[c]				
Non-PAH HAPs				
Acetaldehyde[c]	7.67E-04	0.00E+00	0.00E+00	**0.00E+00**
Acrolein[c]	9.25E-05	0.00E+00	0.00E+00	0.00E+00
Benzene[c,e]	9.33E-04	0.00E+00	0.00E+00	**0.00E+00**
1,3-Butadiene[c,e]	3.91E-05	0.00E+00	0.00E+00	**0.00E+00**
Ethylbenzene[e]				
Formaldehyde[c,e]	1.18E-03	0.00E+00	0.00E+00	**0.00E+00**
Hexane[e]				
Isooctane				
Methyl Ethyl Ketone[e]				
Pentane[e]				
Propionaldehyde[e]				
Quinone[e]				
Methyl chloroform[e]				
Toluene[c,e]	4.09E-04	0.00E+00	0.00E+00	0.00E+00
Xylene[c,e]	2.85E-04	0.00E+00	0.00E+00	0.00E+00
PAH, Total		0.00E+00		**0.00E+00**
POM (7-PAH Group)		0.00E+00	0.00E+00	**0.00E+00**

Pollutant	Emission Factor[a] (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) **Annual** or 24-hr Average
PAH HAPs				
2-Methylnaphthalene				
3-Methylchloranthrene[e]				
Acenaphthene[c1]	1.42E-06	0.00E+00	0.00E+00	**0.00E+00**
Acenaphthylene[c1]	5.06E-06	0.00E+00	0.00E+00	**0.00E+00**
Anthracene[c1]	1.87E-06	0.00E+00	0.00E+00	**0.00E+00**
Benzo(a)anthracene[c1]	1.68E-06	0.00E+00	0.00E+00	**0.00E+00**
Benzo(a)pyrene[c1,e]	1.88E-07	0.00E+00	0.00E+00	**0.00E+00**
Benzo(b)fluoranthene[c1]	9.91E-08	0.00E+00	0.00E+00	**0.00E+00**
Benzo(e)pyrene				
Benzo(g,h,l)perylene[c1]	4.89E-07	0.00E+00	0.00E+00	**0.00E+00**
Benzo(k)fluoranthene[c1]	1.55E-07	0.00E+00	0.00E+00	**0.00E+00**
Chrysene[c1]	3.53E-07	0.00E+00	0.00E+00	**0.00E+00**
Dibenzo(a,h)anthracene[c1]	5.83E-07	0.00E+00	0.00E+00	**0.00E+00**
Dichlorobenzene				
Fluoranthene[c1]	7.61E-06	0.00E+00	0.00E+00	**0.00E+00**
Fluorene[c1]	2.92E-05	0.00E+00	0.00E+00	**0.00E+00**
Indeno(1,2,3-cd)pyrene[c1]	3.75E-07	0.00E+00	0.00E+00	**0.00E+00**
Naphthalene[c1,e]	8.48E-05	0.00E+00	0.00E+00	**0.00E+00**
Perylene				
Phenanthrene[c1]	2.94E-05	0.00E+00	0.00E+00	**0.00E+00**
Pyrene[c1]	4.78E-06	0.00E+00	0.00E+00	**0.00E+00**
Non-HAP Organic Compounds				
Acetone[e]				
Benzaldehyde				
Butane				
Butyraldehyde				
Crotonaldehyde[e]				
Ethylene				
Heptane				
Hexanal				
Isovaleraldehyde				
2-Methyl-1-pentene				
2-Methyl-2-butene				
3-Methylpentane				
1-Pentene				
n-Pentane				
Valeraldehyde				
Metals				
Antimony[e]				
Arsenic[e]				
Barium[e]				
Beryllium[e]				
Cadmium[e]				
Chromium[e]				
Cobalt[e]				
Copper[e]				
Hexavalent Chromium[e]				
Manganese[e]				
Mercury[e]				
Molybdenum[e]				
Nickel[e]				
Phosphorus[e]				
Silver[e]				
Selenium[e]				
Thallium[e]				
Vanadium[e]				
Zinc[e]				

a) Emission factors are from AP-42

b) AP-42, Table 3.4-1, Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual Fuel Engines, 10/96

c) AP-42, Table 3.4-3, Speciated Organic Compound Emission Factors for Large Uncontrolled Stationary Diesel Engines, **Emission Factor Rating E**, 10/96

c1) AP-42, Table 3.4-4, PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines, **Emission Factor Rating E**, 10/96

d) AP-42, Table 3.4-2, Particulate and Particle-Sizing Emission Factors for Large Uncontrolled Stationary Diesel Engines, **Emission Factor Rating E**, 10/96

e) IDAPA Toxic Air Pollutant

TAPs lb/hr rates are 24-hr averages except for those in bold text. Lb/hr rates for bold TAPs (carcinogens) are annual averages.

Facility: F. W. Feenstra Construction, Inc. - 00580
P-2017.0058
Project
2/7/2018 8:20 Permit/Facility ID: 61971 777-00580 User Input Weight % Sulfur = [illegible] SO2 EF = 1.01 x S

Small Engine #1

Fuel Type Toggle = [illegible] [illegible]
Fuel Consumption Rate [illegible] gal/hr
Calculated MMBtu/hr [illegible] MMBtu/hr
Max Daily Operation [illegible] hr/day
Max Annual Operation [illegible] hr/yr

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) Annual or 24-hr Average
PM	[illegible]	[illegible]	[illegible]	
PM-10 (total)	[illegible]	[illegible]	0.000	
P.M.-2.5	[illegible]	[illegible]	0.00	
CO	[illegible]	[illegible]	[illegible]	
NOx	[illegible]	[illegible]	[illegible]	
SO2 (total SOx presumed SO2)	[illegible]	[illegible]	[illegible]	
VOC (total TOC -> VOCs)	[illegible]	[illegible]	[illegible]	
Lead				
HCl				
Dioxins				
2,3,7,8-TCDD				
Total TCDD				
1,2,3,7,8-PeCDD				
Total PeCDD				
1,2,3,4,7,8-HxCDD				
1,2,3,6,7,8-HxCDD				
1,2,3,7,8,9-HxCDD				
Total HxCDD				
1,2,3,4,6,7,8-Hp-CDD				
Total HpCDD				
Octa CDD				
Total PCDD				
Furans				
2,3,7,8-TCDF				
Total TCDF				
1,2,3,7,8-PeCDF				
2,3,4,7,8-PeCDF				
Total PeCDF				
1,2,3,4,7,8-HxCDF				
1,2,3,6,7,8-HxCDF				
2,3,4,6,7,8-HxCDF				
1,2,3,7,8,9-HxCDF				
Total HxCDF				
1,2,3,4,6,7,8-HpCDF				
1,2,3,4,7,8,9-HpCDF				
Total HpCDF				
Octa CDF				
Total PCDF				
Total PCDD/PCDF				
Non-PAH HAPs				
Acetaldehyde	[illegible]	[illegible]	[illegible]	[illegible]
Acrolein	[illegible]	[illegible]	[illegible]	[illegible]
Benzene	[illegible]	[illegible]	[illegible]	[illegible]
1,3-Butadiene	[illegible]	[illegible]	[illegible]	[illegible]
Ethylbenzene				
Formaldehyde	[illegible]	[illegible]	0.00E+00	0.00E+00
Hexane				
Isooctane				
Methyl Ethyl Ketone				
Pentane				
Propionaldehyde				
Quinone				
Methyl chloroform				
Toluene	[illegible]	[illegible]	[illegible]	[illegible]
Xylene	[illegible]	[illegible]	[illegible]	[illegible]
PAH, Total		[illegible]		[illegible]
POM (7-PAH Group)		[illegible]	[illegible]	[illegible]

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) Annual or 24-hr Average
PAH HAPs				
2-Methylnaphthalene				
3-Methylchloranthrene				
Acenaphthene	[illegible]	[illegible]	[illegible]	[illegible]
Acenaphthylene	[illegible]	[illegible]	[illegible]	[illegible]
Anthracene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(a)anthracene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(a)pyrene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(b)fluoranthene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(e)pyrene				
Benzo(g,h,i)perylene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(k)fluoranthene	[illegible]	[illegible]	[illegible]	0.00E+00
Chrysene	[illegible]	[illegible]	[illegible]	0.00E+00
Dibenzo(a,h)anthracene	[illegible]	[illegible]	[illegible]	0.00E+00
Dichlorobenzene				
Fluoranthene	[illegible]	[illegible]	[illegible]	0.00E+00
Fluorene	[illegible]	[illegible]	[illegible]	0.00E+00
Indeno(1,2,3-cd)pyrene	[illegible]	[illegible]	[illegible]	0.00E+00
Naphthalene	[illegible]	[illegible]	[illegible]	[illegible]
Perylene	[illegible]	[illegible]	[illegible]	[illegible]
Phenanthrene	[illegible]	[illegible]	[illegible]	[illegible]
Pyrene				
Non-HAP Organic Compounds				
Acetone				
Benzaldehyde				
Butane				
Butyraldehyde				
Crotonaldehyde				
Ethylene				
Heptane				
Hexanal				
Isovaleraldehyde				
2-Methyl-1-pentene				
2-Methyl-2-butene				
3-Methylpentane				
1-Pentene				
n-Pentane				
Valeraldehyde				
Metals				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Chromium				
Cobalt				
Copper				
Hexavalent Chromium				
Manganese				
Mercury				
Molybdenum				
Nickel				
Phosphorus				
Silver				
Selenium				
Thallium				
Vanadium				
Zinc				

a) Emission factors are from AP-42
b) AP-42 Table 3.3-1 Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines 10/96
c) AP-42 Table 3.3-2 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engine [illegible] 10/96
d) (reserved)
e) IDAPA Toxic Air Pollutant

TAPs lb/hr rates are 24-hr averages except for those in bold text. Lb/hr rates for bold TAPs (carcinogens) are annual averages.

Small Engine #2

Fuel Type Toggle = [illegible] [illegible]
Fuel Consumption Rate [illegible] gal/hr
Calculated MMBtu/hr [illegible] MMBtu/hr
Max Daily Operation [illegible] hr/day
Max Annual Operation [illegible] hr/yr

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) Annual or 24-hr Average
PM	[illegible]	[illegible]	[illegible]	
PM-10 (total)	[illegible]	[illegible]	[illegible]	
P.M.-2.5	0.000	0.000	[illegible]	
CO	[illegible]	[illegible]	[illegible]	
NOx	[illegible]	0.000	0.00	
SO2 (total SOx presumed SO2)	[illegible]	[illegible]	[illegible]	
VOC (total TOC -> VOCs)	[illegible]	[illegible]	[illegible]	
Lead				
HCl				
Dioxins				
2,3,7,8-TCDD				
Total TCDD				
1,2,3,7,8-PeCDD				
Total PeCDD				
1,2,3,4,7,8-HxCDD				
1,2,3,6,7,8-HxCDD				
1,2,3,7,8,9-HxCDD				
Total HxCDD				
1,2,3,4,6,7,8-Hp-CDD				
Total HpCDD				
Octa CDD				
Total PCDD				
Furans				
2,3,7,8-TCDF				
Total TCDF				
1,2,3,7,8-PeCDF				
2,3,4,7,8-PeCDF				
Total PeCDF				
1,2,3,4,7,8-HxCDF				
1,2,3,6,7,8-HxCDF				
2,3,4,6,7,8-HxCDF				
1,2,3,7,8,9-HxCDF				
Total HxCDF				
1,2,3,4,6,7,8-HpCDF				
1,2,3,4,7,8,9-HpCDF				
Total HpCDF				
Octa CDF				
Total PCDF				
Total PCDD/PCDF				
Non-PAH HAPs				
Acetaldehyde	[illegible]	[illegible]	[illegible]	[illegible]
Acrolein	[illegible]	[illegible]	[illegible]	[illegible]
Benzene	[illegible]	[illegible]	[illegible]	[illegible]
1,3-Butadiene	[illegible]	[illegible]	[illegible]	[illegible]
Ethylbenzene				
Formaldehyde	[illegible]	[illegible]	[illegible]	[illegible]
Hexane				
Isooctane				
Methyl Ethyl Ketone				
Pentane				
Propionaldehyde				
Quinone				
Methyl chloroform				
Toluene	[illegible]	[illegible]	[illegible]	[illegible]
Xylene	[illegible]	[illegible]	[illegible]	[illegible]
PAH, Total		[illegible]		[illegible]
POM (7-PAH Group)		[illegible]	[illegible]	[illegible]

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (T/yr)	TAPs Emissions (lb/hr) Annual or 24-hr Average
PAH HAPs				
2-Methylnaphthalene				
3-Methylchloranthrene				
Acenaphthene	[illegible]	[illegible]	[illegible]	[illegible]
Acenaphthylene	[illegible]	[illegible]	[illegible]	[illegible]
Anthracene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(a)anthracene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(a)pyrene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(b)fluoranthene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(e)pyrene				
Benzo(g,h,i)perylene	[illegible]	[illegible]	[illegible]	[illegible]
Benzo(k)fluoranthene	[illegible]	[illegible]	[illegible]	[illegible]
Chrysene	[illegible]	[illegible]	[illegible]	[illegible]
Dibenzo(a,h)anthracene	3.48E-07	[illegible]	[illegible]	0.00E+00
Dichlorobenzene				
Fluoranthene	[illegible]	[illegible]	[illegible]	[illegible]
Fluorene	[illegible]	[illegible]	[illegible]	0.00E+00
Indeno(1,2,3-cd)pyrene	[illegible]	[illegible]	[illegible]	0.00E+00
Naphthalene	[illegible]	[illegible]	[illegible]	[illegible]
Perylene	[illegible]	[illegible]	[illegible]	[illegible]
Phenanthrene	[illegible]	[illegible]	[illegible]	0.00E+00
Pyrene				
Non-HAP Organic Compounds				
Acetone				
Benzaldehyde				
Butane				
Butyraldehyde				
Crotonaldehyde				
Ethylene				
Heptane				
Hexanal				
Isovaleraldehyde				
2-Methyl-1-pentene				
2-Methyl-2-butene				
3-Methylpentane				
1-Pentene				
n-Pentane				
Valeraldehyde				
Metals				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Chromium				
Cobalt				
Copper				
Hexavalent Chromium				
Manganese				
Mercury				
Molybdenum				
Nickel				
Phosphorus				
Silver				
Selenium				
Thallium				
Vanadium				
Zinc				

Combined Emissions of Small Engines

Pollutant	Total Emissions (lb/hr)	Total Emissions (T/yr)	Pollutant	Total Emissions (lb/hr)	Total Emissions (T/yr)
PM	[illegible]	[illegible]	PAH HAPs		
PM-10 (total)	[illegible]	[illegible]	2-Methylnaphthalene		
P.M.-2.5	0.000	0.00	3-Methylchloranthrene		
CO	[illegible]	[illegible]	Acenaphthene	[illegible]	[illegible]
NOx	[illegible]	0.00	Acenaphthylene	[illegible]	[illegible]
SO2 (total SOx presumed SO2)	[illegible]	0.00	Anthracene	[illegible]	[illegible]
VOC (total TOC -> VOCs)	[illegible]	[illegible]	Benzo(a)anthracene	[illegible]	[illegible]
Lead			Benzo(a)pyrene	0.00E+00	0.00E+00
HCl			Benzo(b)fluoranthene	[illegible]	[illegible]
Dioxins			Benzo(e)pyrene		
2,3,7,8-TCDD			Benzo(g,h,i)perylene	0.00E+00	0.00E+00
Total TCDD			Benzo(k)fluoranthene	[illegible]	[illegible]
1,2,3,7,8-PeCDD			Chrysene	0.00E+00	0.00E+00
Total PeCDD			Dibenzo(a,h)anthracene	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD			Dichlorobenzene		
1,2,3,6,7,8-HxCDD			Fluoranthene	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDD			Fluorene	[illegible]	[illegible]
Total HxCDD			Indeno(1,2,3-cd)pyrene	[illegible]	[illegible]
1,2,3,4,6,7,8-Hp-CDD			Naphthalene	[illegible]	[illegible]
Total HpCDD			Perylene	[illegible]	0.00E+00
Octa CDD			Phenanthrene	[illegible]	[illegible]
Total PCDD			Pyrene	[illegible]	[illegible]
Furans			Non-HAP Organic Compounds		
2,3,7,8-TCDF			Acetone		
Total TCDF			Benzaldehyde		
1,2,3,7,8-PeCDF			Butane		
2,3,4,7,8-PeCDF			Butyraldehyde		
Total PeCDF			Crotonaldehyde		
1,2,3,4,7,8-HxCDF			Ethylene		
1,2,3,6,7,8-HxCDF			Heptane		
2,3,4,6,7,8-HxCDF			Hexanal		
1,2,3,7,8,9-HxCDF			Isovaleraldehyde		
Total HxCDF			2-Methyl-1-pentene		
1,2,3,4,6,7,8-HpCDF			2-Methyl-2-butene		
1,2,3,4,7,8,9-HpCDF			3-Methylpentane		
Total HpCDF			1-Pentene		
Octa CDF			n-Pentane		
Total PCDF			Valeraldehyde		
Total PCDD/PCDF			Metals		
Non-PAH HAPs			Antimony		
Acetaldehyde	[illegible]	[illegible]	Arsenic		
Acrolein	[illegible]	[illegible]	Barium		
Benzene	[illegible]	[illegible]	Beryllium		
1,3-Butadiene	[illegible]	[illegible]	Cadmium		
Ethylbenzene			Chromium		
Formaldehyde	[illegible]	[illegible]	Cobalt		
Hexane			Copper		
Isooctane			Hexavalent Chromium		
Methyl Ethyl Ketone			Manganese		
Pentane			Mercury		
Propionaldehyde			Molybdenum		
Quinone			Nickel		
Methyl chloroform			Phosphorus		
Toluene	[illegible]	[illegible]	Silver		
Xylene	[illegible]	[illegible]	Selenium		
			Thallium		
PAH, Total	[illegible]	[illegible]	Vanadium		
POM (7-PAH Group)	[illegible]	[illegible]	Zinc		

Facility: P. W. Feenstra Construction, Inc. - 00580

2/7/2018 9:06 Permit/Facility ID: P-2017.0059 Project 61971 777-00580

Greenhouse Gas Emissions when Combusting Natural Gas

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	0	lb/MMscf	AP-42 Table 1.4-2	0.00	1	0.00
Methane	0	lb/MMscf	AP-42 Table 1.4-2	0.00E+00	21	0.00E+00
N_2O	0	lb/MMscf	AP-42 Table 1.4-2	0.00E+00	310	0.00E+00

* Water Heater #1 does not burn Natural Gas.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	0	lb/MMscf	AP-42 Table 1.4-2	0.00	1	0.00
Methane	0	lb/MMscf	AP-42 Table 1.4-2	0.00E+00	21	0.00E+00
N_2O	0	lb/MMscf	AP-42 Table 1.4-2	0.00E+00	310	0.00E+00

* Water Heater #2 does not burn Natural Gas.

Greenhouse Gas Emissions when Combusting #2 Diesel

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	Molecular conversion from C to CO_2			0.00	1	0.00
Methane	0	lb/10^3 gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N_2O	0	lb/10^3 gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

* Water Heater #1 does not burn Diesel.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	Mocular conversion from C to CO_2			0.00	1	0.00
Methane	0	lb/10^3 gal	AP-42 Table 1.3-3	0.00E+00	21	0.00E+00
N_2O	0	lb/10^3 gal	AP-42 Table 1.3-8	0.00E+00	310	0.00E+00

* Water Heater #2 does not burn Diesel.

Greenhouse Gas Emissions when Combusting LPG

Water Heater #1 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N_2O	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

* Water Heater #1 does not burn Propane.

Water Heater #2 Emissions	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00	1	0.00
Methane	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00E+00	21	0.00E+00
N_2O	0	lb/10^3 gal	AP-42 Table 1.5-1	0.00E+00	310	0.00E+00

* Water Heater #2 does not burn Propane.

Greenhouse Gas Emissions when Combusting Diesel Fuel

Small Engine #1 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

* There are no engines at this facility.

Small Engine #2 Emissions ≤ 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	1.15	lb/bhp-hr	AP-42 Table 3.3-1	0.00	1	0.00

* There is no second small engine at this facility.

Large Engine #1 Emissions > 600 bhp	Emission Factor (EF)	EF Units	EF Source	T/yr	Global Warming Potential	CO_2e (T/yr)
CO_2	1.16	lb/bhp-hr	AP-42 Table 3.4-1	0.00	1	0.00

* There is no large engine at this facility.

Total Greenhouse Gas Emissions

	CO_2e (T/yr)
CO_2	0.00
Methane	0.00
N_2O	0.00
Total	**0.00**

Facility: **P. W. Feenstra Construction, Inc. - 00580**
2/7/2018 9:06 **Permit/Facility ID:** **777-00580** **P-2017.0059 Project 61971**

Max Hourly Production	150 cy/hr	**82%** T/hr is Aggregate =	**123 cy/hr**
Max Daily Production	2,000 cy/day	82% T/hr is Aggregate =	**1,640 cy/day**
Max Annual Production	30,000 cy/yr	82% T/hr is Aggregate =	**24,600 cy/yr**

Aggregate is considered both coarse and fine (sand).The 82% is based on 1,865 lb coarse aggregate, 1,428 lb sand, 564 lb cement/supplement and 167 lb water for a total of 4,024 lb concrete

Truck Mix Operations Drop Points, AP-42 11-12 (06/06)

$E = k\,(0.0032)\,x(U^a\ /\ M^b)+c\ =$ 9.71E-02 3.88E-02 lb/ton for PM10 5.83E-03 lb/ton for PM2.5

k = particle size multiplier	0.8 for PM	0.32 for PM10	0.048 for PM2.5
a = exponent	1.75 for PM	1.75 for PM10	1.75 for PM2.5
b = exponent	0.3 for PM	0.3 for PM10	0.3 for PM2.5
c = constant	0.013 for PM	0.0052 for PM10	0.00078 for PM2.5
U = mean wind speed =	**10** mph		
M = moisture content =	**6** %		

Mean wind spped: 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.
This data is from the Western Regional Climate Center (http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO).

Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggegate respectively. These values are based on EPA tests conducted at Cheney Enterprises Cement plant in Roanoke, VA, 1994. (AP-42 11-12 06/06).

Windspeed Variation Factors for AERMOD modeling:				PM10		PM2.5	
Wind Category	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/ E@10mph	E @ avg mph	mph/ E@10mph
Cat 1:	1.54	0.77	1.72	6.75E-03	0.1738	1.01E-03	0.1738
Cat 2:	3.09	2.32	5.18	1.58E-02	0.4077	2.38E-03	0.4077
Cat 3:	5.14	4.12	9.20	3.43E-02	0.8831	5.15E-03	0.8831
Cat 4:	8.23	6.69	14.95	7.32E-02	1.885	1.10E-02	1.885
Cat 5:	10.80	9.52	21.28	1.31E-01	3.382	1.97E-02	3.382
Cat 6:	14.00	12.40	27.74	2.06E-01	5.298	3.09E-02	5.298

Central Mix Operations Drop Points, AP-42 11-12 (06/06)

$E = k\,(0.0032)\,x(U^a\ /\ M^b)+c\ =$ 2.08E-03 1.23E-03 lb/ton for PM10 2.54E-04 lb/ton for PM2.5

k = particle size multiplier	0.19 for PM	0.13 for PM10	0.03 for PM2.5
a = exponent	0.95 for PM	0.45 for PM10	0.45 for PM2.5
b = exponent	0.9 for PM	0.9 for PM10	0.9 for PM2.5
c = constant	0.001 for PM	0.001 for PM10	0.0002 for PM2.5
U = mean wind speed =	**10** mph		
M = moisture content =	**6** %		

Mean wind spped: 7 mph was the average wind speed obtained from an average of 19 Idaho airports throughout the state from 1996-2006.
This data is from the Western Regional Climate Center (http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#IDAHO).

Moisture Content: 4.17 % and 1.77% were the average percentages for sand and aggegate respectively. These values are based on EPA tests conducted at Cheney Enterprises

Windspeed Variation Factors for AERMOD modeling:				PM10		PM2.5	
Wind Category	Upper windspeed (m/sec)	Avg windspeed (m/sec)	Avg windspeed (mph)	E @ avg mph	F = Eavg mph/ E@10mph	E @ avg mph	mph/ E@10mph
Cat 1:	1.54	0.77	1.72	1.11E-03	0.8964	2.24E-04	0.8838
Cat 2:	3.09	2.32	5.18	1.87E-03	1.5160	2.40E-04	0.9456
Cat 3:	5.14	4.12	9.20	2.13E-03	1.7261	2.52E-04	0.9922
Cat 4:	8.23	6.69	14.95	2.41E-03	1.949	2.65E-04	1.0422
Cat 5:	10.80	9.52	21.28	2.65E-03	2.146	2.76E-04	1.0860
Cat 6:	14.00	12.40	27.74	2.86E-03	2.315	2.85E-04	1.1238

Conveyor and Scalping Screen Emission Points

Moisture/Control %:

Aggregate for CBP typically stabilizes between 5-6% by weight--> Apply additional **25%** control to lb/hr, etc. for the higher moisture.

Sand aggregate for CBPs is **36%**

Coarse aggregate for CBPs is **46%**

Fine Aggegate (Sand) Transfer to Conveyor

Transfer from truck to conveyor: **123 cy/hr** **1** Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0015	0.060	0.033	5.99E-03	1.37E-03	0.060	0.033	5.99E-03	1.37E-03
PM-10 (total)	7.00E-04	0.028	0.016	2.80E-03	6.38E-04	0.028	0.016	2.80E-03	6.38E-04
PM-2.5 (total)	2.25E-04	0.009	0.005	8.99E-04	3.94E-03	0.009	0.005	8.99E-04	3.94E-03

Coarse Aggegate Transfer to Conveyor

Transfer from truck to conveyor: **123 cy/hr** **1** Transfer Points

Pollutant	Emission Factor Table 11.12-5 CONVEYOR TRANSFER PT CONTROLLED (lb/cy)	Emissions Per Transfer Point				Total Emissions			
		Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average	Emissions (lb/hr) 1-hr Average	Emissions (lb/hr) 24-hr Average	Emissions (T/yr)	Emissions (lb/hr) Annual Average
PM (total)	0.0064	0.331	0.184	3.31E-02	7.56E-03	0.331	0.184	3.31E-02	7.56E-03
PM-10 (total)	3.10E-03	0.160	0.089	1.60E-02	3.66E-03	0.160	0.089	1.60E-02	3.66E-03
PM-2.5 (total)	9.60E-04	0.050	0.028	4.97E-03	2.18E-02	0.050	0.028	4.97E-03	2.18E-02

Final Concrete Batch Plant Emissions Inventory

Listed Below are the emissions estimates for the units selected.

Company:	**P. W. Feenstra Construction, Inc. - 00580**
Facility ID:	**777-00580**
Permit No.:	**P-2017.0059 Project 61971**
Source Type:	**Portable Concrete Batch Plant**
Manufacturer/Model:	**Concrete Equipment Co. 327D**

Production

Maximum Hourly Production Rate:	150	cy/hr
Proposed Daily Production Rate:	2000	cy/day
Proposed Maximum Annual Production Rate:	30000	cy/year

Emissions Units		Tons/year								
		PM$_{2.5}$	PM$_{10}$	SO$_2$	NO$_x$	CO	VOC	Lead	THAPs	CO$_2$e
CBP Type:	**Truck Mix**	0.001	0.00	NA	NA	NA	NA	1.42E-05		N/A
Water Heater #1:	**No water heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00		0
Water Heater #2:	**No water heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00		0
Small Diesel Engine(s) *:	**No Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0
Large Diesel Engine *:	**No Large Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA		0
	Transfer/Drop Points	0.006	0.02	NA	NA	NA	NA	NA		N/A
	Annual Totals (T/yr)	**0.01**	**0.02**	**0.00E+00**	**0.00**	**0.00**	**0.00**	**1.42E-05**	**1.55E-04**	**0**

		Pounds/hour							
		PM$_{2.5}$	PM$_{10}$	SO$_2$	NO$_x$	CO	VOC	Lead	THAPs
CBP Type:	**Truck Mix**	0.993	1.67	NA	NA	NA	NA	4.15E-05	
Water Heater #1:	**No water heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00	
Water Heater #2:	**No water heater**	0.000	0.000	0.00E+00	0.000	0.000	0.000	0.00E+00	
Small Diesel Engine(s) *:	**No Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA	
Large Diesel Engine*:	**No Large Engine**	0.00	0.00	0.00E+00	0.00	0.00	0.00	NA	
	Transfer/Drop Points	0.033	0.10	NA	NA	NA	NA	NA	
	Daily Totals (lb/hr)	**1.03**	**1.77**	**0.00E+00**	**0.00**	**0.00**	**0.00**	**4.15E-05**	**7.81E-04**

* The Large engine may run : **There is no large engine.** hr/yr
* The Small engine(s) may run : **There is no small engine.** hr/yr

HAPS & TAPS Emissions Inventory

Metals	**HAP**	**TAP**	**lb/hr**	**T/yr**	**Averaging Period**	**EL lb/hr**	**Exceeded?**
Arsenic	X	X	**3.07E-06**	**1.35E-05**	Annual	1.50E-06	**Yes**
Barium		X	**0.00E+00**	**0.00E+00**	24-hour	3.30E-02	**No**
Beryllium	X	X	**7.06E-08**	**3.09E-07**	Annual	2.80E-05	**No**
Cadmium	X	X	**2.05E-07**	**8.98E-07**	Annual	3.70E-06	**No**
Cobalt	X	X	**0.00E+00**	**0.00E+00**	24-hour	3.30E-03	**No**
Copper		X	**0.00E+00**	**0.00E+00**	24-hour	1.30E-02	**No**
Chromium	X	X	**9.25E-05**	**1.28E-05**	24-hour	3.30E-02	**No**
Manganese	X	X	**3.67E-04**	**6.53E-05**	24-hour	3.33E-01	**No**
Mercury	X	X	**0.00E+00**	**0.00E+00**	24-hour	N/A	**No**
Molybdenum (soluble)		X	**0.00E+00**	**0.00E+00**	24-hour	3.33E-01	**No**
Nickel	X	X	**3.19E-06**	**1.40E-05**	Annual	2.70E-05	**No**
Phosphorus	X	X	**2.98E-04**	**4.25E-05**	24-hour	7.00E-03	**No**
Selenium	X	X	**1.56E-05**	**2.81E-06**	24-hour	1.30E-02	**No**
Vanadium		X	**0.00E+00**	**0.00E+00**	24-hour	3.00E-03	**No**
Zinc		X	**0.00E+00**	**0.00E+00**	24-hour	6.67E-01	**No**
Chromium VI	X	X	**6.37E-07**	**2.79E-06**	Annual	5.60E-07	**Yes**
Non PAH Organic Compunds							
Pentane		X	**0.00E+00**	**0.00E+00**	24-hour	118	**No**
Methyl Ethyl Ketone		X	**0.00E+00**	**0.00E+00**	24-hour	39.3	**No**
Non-PAH HAPs							
Acetaldehyde	X	X	**0.00E+00**	**0.00E+00**	Annual	3.00E-03	**No**
Acrolein	X	X	**0.00E+00**	**0.00E+00**	24-hour	1.70E-02	**No**
Benzene	X	X	**0.00E+00**	**0.00E+00**	Annual	8.00E-04	**No**
1,3 - Butadiene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.40E-05	**No**
Ethyl Benzene	X	X	**0.00E+00**	**0.00E+00**	24-hour	29	**No**
Formaldehyde	X	X	**0.00E+00**	**0.00E+00**	Annual	5.10E-04	**No**
Hexane	X	X	**0.00E+00**	**0.00E+00**	24-hour	12	**No**
Isooctane	X		**0.00E+00**	**0.00E+00**	N/A	N/A	**N/A**
Methyl Chloroform	X	X	**0.00E+00**	**0.00E+00**	24-hour	127	**No**
Propionaldehyde	X	X	**0.00E+00**	**0.00E+00**	24-hour	2.87E-02	**No**
Quinone	X	X	**0.00E+00**	**0.00E+00**	24-hour	2.70E-02	**No**
Toluene	X	X	**0.00E+00**	**0.00E+00**	24-hour	25	**No**
o-Xylene	X	X	**0.00E+00**	**0.00E+00**	24-hour	29	**No**
PAH HAPs							
2-Methylnaphthalene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
3-Methylcholanthrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.50E-06	**No**
7,12-Dimethylbenz(a)anthracene	X		**0.00E+00**	**0.00E+00**	N/A	N/A	**N/A**
Acenaphlhene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Acenaphthylene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(a)anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(a)pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Benzo(b)fluoranthene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Benzo(e)pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Benzo(g,h,i)perylene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Benzo(k)fluoranthene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Chrysene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Dibenzo(a,h)anthracene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Dichlorobenzene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Fluoranthene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Fluorene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Indeno(1,2,3-cd)pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**
Naphthalene (24-hour)	X	X	**0.00E+00**	**0.00E+00**	24-hour	3.33	**No**
Naphthalene (Annual)	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Perylene	X		**0.00E+00**	**0.00E+00**	N/A	N/A	**N/A**
Phenanalhrene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
Pyrene	X	X	**0.00E+00**	**0.00E+00**	Annual	9.10E-05	**No**
PAH HAPs Total	X	X	**0.00E+00**		Annual	2.00E-06	**No**
Polycyclic Organic Matter (POM)	X	X	**0.00E+00**	**0.00E+00**	Annual	2.00E-06	**No**

Total HAPs Emissions (lb/hr) and (T/yr): 7.81E-04 1.55E-04

Facility: P. W. Feenstra Construction, Inc. - 00580
2/7/2018 9:06 Permit P-2017.0059 Project 61971 Facility ID: 777-00580

Internal Combustion Engine > 600 hp (447 kW)

Fuel Type Toggle =	0	
Fuel Consumption Rate	0.00	gal/hr
Calculated MMBtu/hr	0.00	MMBtu/hr
Max Daily Operation	0	hr/day
Max Annual Operation	0	hrs/yr

Rated Power of Large (hp): 0

Not EPA Certified	No
Certified EPA Tier 1	No
Certified EPA Tier 2	No
Certified EPA Tier 3	No
Certified EPA Tier 4	No
Blue Sky Engine	No

Small Internal Combustion Engine #1 < 600 hp (447 kW)

Fuel Type Toggle =	0	
Fuel Consumption Rate	0.00	gal/hr
Calculated MMBtu/hr	0.00	MMBtu/hr
Max Daily Operation	8	hr/day
Max Annual Operation	0	hrs/yr

Rated Power of Small #1 (hp): 0

Not EPA Certified	No
Certified EPA Tier 1	No
Certified EPA Tier 2	No
Certified EPA Tier 3	No
Certified EPA Tier 4	No
Blue Sky Engine	No

Small Internal Combustion Engine #2 < 600 hp (447 kW)

Fuel Type Toggle =	0	
Fuel Consumption Rate	0.00	gal/hr
Calculated MMBtu/hr	0.00	MMBtu/hr
Max Daily Operation	8	hr/day
Max Annual Operation	0	hrs/yr

Rated Power of Small #2 (hp): 0

Not EPA Certified	No
Certified EPA Tier 1	No
Certified EPA Tier 2	No
Certified EPA Tier 3	No
Certified EPA Tier 4	No
Blue Sky Engine	No

Conversion Factors:

Avg brake-specific fuel consumption (BSFC) =	7000	Btu/hp-hr
1 hp =	0.746	kW
1 lb =	453.592	g

g/kW-hr x (lb/453g) x (hp-hr/7000 Btu) x (0.746 kW/hp) x 10^6 Btu/MMBtu = lb/MMBtu
g/kW-hr x 0.23486 = lb/MMBtu

Pollutant:	NOx	VOC (total TOC--> VOCs)		CO	PM=PM10
EMISSION FACTORS USED FOR SMALL ENGINE (lb/MMBtu):	**0.00**	**0.00**		**0.00**	**0.000**
Pollutant:	**NOx**	**VOC (total TOC--> VOCs)**		**CO**	**PM=PM10**
EMISSION FACTORS USED FOR LARGE ENGINE (lb/MMBtu):	**0.00**	**0.00**		**0.00**	**0.000**

AP-42, 3.4 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)

Pollutant:	NOx	VOC (total TOC--> VOCs)		CO	PM10
Emission Factor (lb/MMBtu)	0	0		0.00	0
Emission Factor (g/kW-hr))	0.00	0.00		0.00	0.00

AP-42, Ch 3.3 (10/96) EMISSION FACTORS (diesel fueled, uncontrolled)

Pollutant:	NOx	VOC (total TOC--> VOCs)		CO	PM10
Emission Factor (lb/MMBtu)	4.41	0.36		0.95	0.31
Emission Factor (g/kW-hr))	18.78	1.53		4.05	1.32

Note Rating for AP-42 PM10 EF of 0.0573 is "E" or Poor. Used Tier 1 PM EF and presumed PM = PM10

40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS (g/kW-hr converted to lb/MMBtu)

Rated Power (kW)	Tier	Applicable?	Model Year^1	NOx	HC	NMHC + NOx	CO	PM = PM10
kW < 8	1	0	2000	0.0	0.36	2.47	1.88	0.23
kW < 8	2	0	2005	0.00	0.36	1.76	1.88	0.19
kW < 8	4	0	2008	0.00	0.36	1.76	1.88	0.09
kW < 8	BlueSky	0	n/a	0.00	0.36	1.08	1.88	0.11
8 ≤ kW < 19	1	0	2000	0.00	0.36	2.23	1.55	0.19
8 ≤ kW < 19	2	0	2005	0.00	0.36	1.76	1.55	0.19
8 ≤ kW < 19	4	0	2008	0.00	0.36	1.76	1.55	0.09
8 ≤ kW < 19	BlueSky	0	n/a	0.00	0.36	1.06	1.55	0.11
19 ≤ kW < 37	1	0	1999	0.00	0.36	2.23	1.29	0.19
19 ≤ kW < 37	2	0	2004	0.00	0.36	1.76	1.29	0.14
19 ≤ kW < 37	4	0	2008	0.00	0.36	1.10	1.29	0.007
19 ≤ kW < 37	BlueSky	0	n/a	0.00	0.36	1.08	1.29	0.085
37 < kW < 75	1	0	1998	2.16	0.36	0.00	---	---
37 < kW < 75	2	0	2004	0.00	0.36	1.76	1.17	0.09
37 < kW < 75	3	0	2008	0.00	0.36	1.10	1.17	0.09
37 < kW < 75	4	0	2008	0.00	0.36	1.10	1.17	0.007
37 ≤ kW < 75	BlueSky	0	n/a	0.00	0.36	1.10	1.17	0.056
75 < kW < 130	1	0	1997	2.16	0.36	0.00	---	---
75 < kW < 130	2	0	2003	0.00	0.36	1.55	1.17	0.07
75 < kW < 130	3	0	2007	0.00	0.36	0.94	1.17	0.07
75 < kW < 130	4	0	2008	0.09	0.04	0.00	1.17	0.005
75 ≤ kW < 130	BlueSky	0	n/a	0.00	0.36	0.94	1.17	0.042
130 < kW < 225	1	0	1996	2.16	0.31	0.00	2.68	0.13
130 < kW < 225	2	0	2003	0.00	0.31	1.55	0.82	0.05
130 < kW < 225	3	0	2006	0.00	0.31	0.94	0.82	0.05
130 < kW < 560	4	0	2008	0.09	0.04	0.00	0.82	0.005
130 ≤ kW ≤ 560	BlueSky	0	n/a	0.00	0.31	0.94	0.82	0.028
225 < kW < 450	1	0	1996	2.16	0.31	0.00	2.68	0.13
225 < kW < 450	2	0	2001	0.00	0.31	1.50	0.82	0.05
225 ≤ kW < 450	3	0	2006	0.00	0.31	0.94	0.82	0.05
450 < kW < 560	1	0	1996	2.16	0.31	0.00	2.68	0.13
450 < kW < 560	2	0	2002	0.00	0.31	1.50	0.82	0.05
450 ≤ kW ≤ 560	3	0	2006	0.00	0.31	0.94	0.82	0.05
kW > 560	1	0	2000	2.16	0.31	0.00	2.68	0.13
kW > 560	2	0	2006	0.00	0.31	1.50	0.82	0.05
kW > 560	BlueSky	0	n/a	0.00	0.31	0.89	0.82	0.028

40 CFR 89 and 1039, EPA CERTIFIED GENERATOR EMISSION FACTORS FOR LARGE ENGINE (lb/MMBtu)

Rated Power (kW)	Tier	Applicable?	Model Year^1	NOx	HC	NMHC + NOx	CO	PM10
kW< 8	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW< 8	2	0	2005	0.00	0.00	0.00	0.00	0.00
kW< 8	4	0	2008	0.00	0.00	0.00	0.00	0.00
kW< 8	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	1	0	2000	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	2	0	2005	0.00	0.00	0.00	0.00	0.00
8 < kW < 19	4	0	2008	0.00	0.00	0.00	0.00	0.00
8 ≤ kW < 19	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	1	0	1999	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	2	0	2004	0.00	0.00	0.00	0.00	0.00
19 < kW < 37	4	0	2008	0.00	0.00	0.00	0.00	0.00
19 ≤ kW < 37	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	1	0	1998	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	2	0	2004	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	3	0	2008	0.00	0.00	0.00	0.00	0.00
37 < kW < 75	4	0	2008	0.00	0.00	0.00	0.00	0.00
37 ≤ kW < 75	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	1	0	1997	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	2	0	2003	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	3	0	2007	0.00	0.00	0.00	0.00	0.00
75 < kW < 130	4	0	2008	0.00	0.00	0.00	0.00	0.00
75 ≤ kW < 130	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	1	0	1996	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	2	0	2003	0.00	0.00	0.00	0.00	0.00
130 < kW < 225	3	0	2006	0.00	0.00	0.00	0.00	0.00
130 < kW < 560	4	0	2008	0.00	0.00	0.00	0.00	0.00
130 ≤ kW ≤ 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	1	0	1996	0.00	0.00	0.00	0.00	0.00
225 < kW < 450	2	0	2001	0.00	0.00	0.00	0.00	0.00
225 ≤ kW < 450	3	0	2006	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	1	0	1996	0.00	0.00	0.00	0.00	0.00
450 < kW < 560	2	0	2002	0.00	0.00	0.00	0.00	0.00
450 ≤ kW ≤ 560	3	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	1	0	2000	0.00	0.00	0.00	0.00	0.00
kW > 560	2	0	2006	0.00	0.00	0.00	0.00	0.00
kW > 560	BlueSky	0	n/a	0.00	0.00	0.00	0.00	0.00

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: January 28, 2018

TO: Will Tiedemann, Permit Writer, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT: P-2017.0059 PROJ 61971, PTC application from P.W. Feenstra Construction, Inc. for a New Portable Concrete Batch Plant

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

Contents

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
As	Arsenic
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CBP	Concrete Batch Plant
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
Cr6+	Hexavalent Chromium
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
Feenstra	P.W. Feenstra Construction, Inc.
GEP	Good Engineering Practice
hr	hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
m	Meters
m/sec	Meters per second
MMBtu	Million British Thermal Units
NAAQS	National Ambient Air Quality Standards
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NWS	National Weather Service
O_3	Ozone
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	parts per million
PRIME	Plume Rise Model Enhancement
PTC	Permit to Construct
PTE	Potential to Emit

SIL	Significant Impact Level
SO_2	Sulfur Dioxide
TAP	Toxic Air Pollutant
tpy	tons per year
VOC	Volatile Organic Compounds
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

P.W. Feenstra Construction, Inc. (Feenstra) submitted a Permit to Construct (PTC) application for a new portable concrete batch plant (CBP) in Idaho. The PTC application was received on December 12, 2017. The Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03) require that no permit shall be granted unless it is demonstrated that the new source or modification will not cause or contribute to a violation of an applicable air quality standard.

This memorandum provides a summary of the regulatory applicability and air impact analyses performed to satisfy the requirements of Idaho Air Rules Section 203.02 and 203.03. Idaho Air Rules Section 203.02, requiring a demonstration of compliance with National Ambient Air Quality Standards (NAAQS), was not applicable to this permitting action because maximum emissions of criteria pollutants were at levels qualifying the source for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221. The permitting action was subject to Idaho Air Rules Section 203.03, requiring a demonstration of compliance with Toxic Air Pollutant (TAP) increment standards.

Project-specific air quality analyses involving atmospheric dispersion modeling of estimated TAP emissions associated with the facility were performed by DEQ to demonstrate that the facility would not cause a violation of any identified TAP Acceptable Ambient Concentration (AAC) or Acceptable Ambient Concentration of a Carcinogen (AACC).

The DEQ review of submitted data/analyses and DEQ performance of air impact analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard or increment. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emissions estimates was primarily the responsibility of the permit writer and is addressed in the main body of the DEQ Statement of Basis, and emissions calculation methods were not evaluated in this modeling review memorandum.

The submitted information and analyses, in combination with DEQ's analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emissions estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emissions increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments.

Table 1 presents key assumptions and results to be considered in the development of the permit.

Idaho Air Rules require air impact analyses be conducted according to methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed by atmospheric dispersion models using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information and analyses, in combination with DEQ's analyses, demonstrated to the satisfaction of the Department that operation of the proposed facility will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure the requirements of Appendix W are met with regard to emissions representing design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Setback from Ambient Air Boundary. A 125 meters (410 feet) separation must be maintained between the truck loadout source and the nearest point of public access (generally the property boundary).	This setback is needed to assure compliance with the TAP AACCs.
Allowable Throughput. An annual throughput restriction of 30,000 cubic yards of concrete was used to demonstrate compliance with TAP increment standards.	An annual throughput restriction is also needed to ensure that annual emissions of criteria pollutants remain below BRC levels.
General Emissions Rates. Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, must represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling analyses.
Below Regulatory Concern for Criteria Pollutant Emissions. Maximum non-fugitive annual emissions of PM_{10}[a], $PM_{2.5}$[b], oxides of nitrogen (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (Pb) are below levels identified as below regulatory concern (BRC) as per Idaho Air Rules Section 221, and the project would be exempt from permitting if it were not for emissions of TAPs exceeding regulatory exemption criteria.	Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels, provided the project would have qualified for a BRC permitting exemption except for the emissions levels of another criteria pollutant exceeding the ton/year BRC threshold.

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

2.0 Background Information

This section provides background information applicable to the project and the site where the facility is located. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

The proposed Feenstra facility is new portable concrete batch plant (CBP). A criteria pollutant air impact analysis was not required for permit issuance because non-fugitive emissions of all criteria pollutants were below BRC levels that provide a threshold for permit issuance. Pollutant-emitting processes performed at the facility will include material handling of cement, aggregate, and fly ash. The PTC addresses all air pollutant emitting activities at the site.

2.2 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*

> ***02. NAAQS.*** *The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*
>
> ***03. Toxic Air Pollutants.*** *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

> ***02. Estimates of Ambient Concentrations.*** *All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.3 Significant Impact Level and Cumulative NAAQS Impact Analyses

The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

If modeled maximum pollutant impacts to ambient air from the emissions sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from facility-wide emissions, and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SILs and specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Impact Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.3	12[k]	Mean of maximum 1st highest[l]
Carbon monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
	24-hour	5	365[m]	Maximum 2nd highest[n]
	Annual	1.0	80[r]	Maximum 1st highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	75 ppb[w]	Not typically modeled

[a] Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.

[b] Micrograms per cubic meter.

[c] Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.

[d] The maximum of 1st highest modeled values is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.

[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

[f] Not to be exceeded more than once per year on average over 3 years.

[g] Concentration at any modeled receptor when using five years of meteorological data.

[h] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

[i] 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.

[j] 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.

[k] 3-year mean of annual concentration.

[l] 5-year mean of annual averages at the modeled receptor.

[m] Not to be exceeded more than once per year.

[n] Concentration at any modeled receptor.

[o] Interim SIL established by EPA policy memorandum.

[p] 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.

[q] 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.

[r] Not to be exceeded in any calendar year.

[s] 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.

[t] 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.

[u] 3-month rolling average.

[v] An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.

[w] Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If the cumulative NAAQS impact analysis indicates a violation of the standard, the permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. As an example, consider a hypothetical case where the SIL analysis indicates the project (new source or modification) has impacts exceeding the SIL and the cumulative impact analysis indicates a violation of the NAAQS. If project-specific impacts are below the SIL at the specific receptors showing the violations during the time periods when modeled violations occurred, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emissions increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.4 *Toxic Air Pollutant Analyses*

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emissions increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated. If a facility will only be located at a specific site for less than five years, then allowable impacts of Idaho Air Rules Section 586 TAPs (carcinogens) are 10 times the AACC increment in Section 586, as per Idaho Air Rules Section 210.15.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements.

3.1 Emissions Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the Feenstra CBP were calculated by DEQ for various applicable averaging periods. The calculation of potential emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emissions estimates is not addressed in this modeling memorandum. DEQ air impact analyses assured that the potential emissions rates provided in the emissions inventory were properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emissions rates used in the dispersion modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emissions inventory. All modeled criteria air pollutant and TAP emissions rates must be equal to or greater than the facility's potential emissions calculated in the PTC emissions inventory or proposed permit allowable emissions rates.

3.1.1 Modeling Applicability and Modeled Criteria Pollutant Emissions Rates

Facility-wide potential to emit (PTE) values for all criteria pollutants would qualify for a below regulatory concern (BRC) permit exemption as per Idaho Air Rules Section 221 (equal to 10 percent of the emissions defined as significant) if it were not for potential emissions of TAPs exceeding the BRC threshold of 10 percent of emissions screening levels (ELs). DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[1]" The interpretation policy also states that the exemption criteria of uncontrolled PTE not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. A permit is needed for the proposed Feenstra CBP only because TAP emissions exceed BRC levels.

The DEQ emissions inventory asserts that facility-wide controlled PTE emissions of specific criteria pollutants are below BRC levels, as listed in Table 3.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.3.3) cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Table 3. CRITERIA POLLUTANT NAAQS COMPLIANCE DEMONSTRATION APPLICABILITY			
Criteria Pollutant	**BRC Level (ton/year)**	**Applicable Facility Wide PTE Emissions (ton/year)**	**Air Impact Analyses Required?**
PM_{10}[a]	1.5	<0.03	No
$PM_{2.5}$[b]	1.0	<0.01	No
Carbon Monoxide (CO)	10.0	<0.01	No
Sulfur Dioxide (SO_2)	4.0	<0.01	No
Nitrogen Oxides (NOx)	4.0	<0.01	No
Lead (Pb)	0.06	<0.0001	No

[a] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.

[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

Addressing secondary formation of O_3 has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

DEQ determined it was not appropriate or necessary to require a quantitative source specific O_3 impact analysis because allowable emissions estimates of VOCs and NOx are below the 100 tons/year threshold.

Secondary Particulate Formation

The impact from secondary particulate formation resulting from emissions of NOx, SO_2, and/or VOCs was assumed by DEQ to be negligible on the basis of the magnitude of emissions.

3.1.2 Toxic Air Pollutant Emissions Rates

TAP emissions regulations under Idaho Air Rules Section 210 are only applicable for new or modified sources constructed after July 1, 1995. TAP compliance for the Feenstra CBP was demonstrated on a facility-wide basis.

Facility-wide emissions of arsenic (As) and chromium 6+ (Cr6+) exceed the applicable emissions screening levels (ELs) of Idaho Air Rules Section 586. Air impact modeling analyses were then required to demonstrate that maximum impacts of As and Cr6+ are below applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586 as AACs and AACCs.

Table 4 lists the TAP modeled emissions rates for As and Cr6+.

Table 4. EMISSIONS RATES MODELED FOR TAP IMPACT ANALYSES			
Source ID	Description	Emission Rates (lb/hr[a])	
		Arsenic Annual	Chromium 6+ Annual
SILO	Cement storage silo filling	3.57E-9	4.88E-9
SUPSILO	Cement supplement (fly ash) storage silo filling	1.25E-7	4.58E-8
UNCONTRKLOAD	Truck loadout	2.95E-6	5.86E-7

[a] Pounds per hour for listed averaging period.

Emissions of As and Cr6+ occur from the handling of both dry cement and fly ash. Emissions from the filling of storage silos are controlled by a filtration system and emissions from truck loadout are controlled by a shroud.

As and Cr6+ are carcinogenic TAPs that are regulated on a long-term basis. Therefore, the appropriate emission rates for impact analyses are maximum annual emissions, expressed as an average pound/hour value over an 8,760-hour period.

3.1.3 Emissions Release Parameters

Table 5 lists emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for emissions sources modeled in the air impact analyses.

Table 5. POINT SOURCE STACK PARAMETERS USED IN MODELING

Point Source Parameters

Release Point	Description	Stack Height (m)[a]	Stack Gas Flow Temp. (K)[b]	Stack Flow Velocity (m/sec)[c]	Stack Dia. (m)[d]
SILO	Cement storage silo filling	6.4 (21 ft)	0[e]	7.05	0.29 (0.96 ft)
SUPSILO	Cement supplement (fly ash) storage silo filling	6.4 (21 ft)	0[e]	7.05	0.29 (0.96 ft)

Volume Source Parameters

Release Point	Description	Release Height (m)	Int. Horz. Dimension σ_{yo}[f] (m)	Int. Vert. Dimension σ_{zo}[g]
UNCONTRK	Truck loadout	3.75	2.33	3.49

[a] Height in meters at the point of release. Values in parentheses are in feet.

[b] Kelvin.

[c] Meters per second.

[d] Stack diameter in meters at the point of release to the atmosphere. Values in parentheses are in feet.

[e] Set to 0 to direct model to use a release temperature equal to the ambient air temperature specified in the meteorological data input file.

[f] Initial horizontal dimension of plume.

[g] Initial vertical dimension of plume.

Emissions from truck loadout of dry concrete, fly ash, and aggregate were modeled as a volume source. The release height was set at 3.75 meters, the typical height of cement truck feed chutes. The initial horizontal dimension (σ_{yo}) was set at a value equal to the length of the source's side divided by 4.3, as directed by EPA guidance for AERMOD[2]. The length of side was set to 10 meters to represent the structure of the plant and any adjacent building, and σ_{yo} was calculated at 2.33 meters. The initial vertical dimension (σ_{zo}) was set at a value equal to the vertical extent of the source or the height of an adjacent building divided by 2.15, as directed by EPA guidance for AERMOD. The vertical extent was set at two times the release height or 7.5 meters, giving a σ_{zo} of 3.49 meters.

3.2 Background Concentrations

Background concentrations are used if a cumulative NAAQS impact analysis is needed to demonstrate compliance with applicable NAAQS. Cumulative NAAQS analyses were not required for this project because emissions of all criteria pollutants were below levels defined as BRC, and as such, air impact analyses were not required for these emissions.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant and/or DEQ to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

DEQ performed the project-specific air pollutant emissions inventory and air impact analyses based on information submitted from the Feenstra facility. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 6 provides a brief description of parameters used in the modeling analyses.

Table 6. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Portable in Idaho	
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 16216r.
Meteorological Data	Multiple Areas	See Section 3.3.4 of this memorandum for additional details of the meteorological data.
Terrain	Not Considered	Flat terrain was assumed in the analyses.
Building Downwash	Considered	A 10 m X 10 m X 10 m structure was conservatively assumed at the center of the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD.
Receptor Grid	Polar Grid	Adequate to resolve maximum modeled impacts

3.3.2 Modeling Methodology

Final project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*[3].

3.3.3 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in Appendix W. The refined, steady-state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD version 16216r was used by DEQ for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.4 Meteorological Data

DEQ air impact analyses used processed meteorological data from numerous locations throughout Idaho. DEQ determined that NAAQS compliance is reasonably assured for all areas of Idaho when compliance is demonstrated by multiple analyses using the following 13 meteorological datasets: Boise, Coeur d'Alene, Twin Falls, Pocatello, Idaho Falls, Pullman/Moscow, Rexburg, Burley, Lewiston (airport), Lewiston (Clearwater site), Sandpoint, Aberdeen, and Jerome.

3.3.5 Effects of Terrain on Modeled Impacts

Terrain effects on dispersion were not considered in the non-site-specific analyses. DEQ contends that assuming flat terrain is not a critical limitation of the analyses because most emissions points associated with CBPs are near ground-level and the immediate surrounding area is typically flat for dispersion modeling purposes. Emissions sources near ground-level typically have maximum pollutant impacts near the source, minimizing the potential effect of surrounding terrain to influence the magnitude of maximum modeled impacts.

3.3.6 Facility Layout

DEQ's analyses used a conservative generic facility layout. This was done because the specific layout will vary depending upon product needs and specific characteristics of the site and equipment. To provide conservative results, DEQ used a tight grouping of emissions sources. Sources were positioned within 7 meters of the center of the facility. The truck loadout source was placed at the center of the facility. Because impacts are primarily driven by the truck loadout source, the positioning of other sources relative to the truck loadout is of little importance.

3.3.7 Effects of Building Downwash on Modeled Impacts

Potential downwash effects on emissions plumes were accounted for in the model by using building dimensions and locations (locations of building corners and building heights). A 10-meter-square building, 10 meters high, was used in the analysis to conservatively account for downwash. Dimensions and orientation of buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD. The primary source driving impacts in the analyses was the truck loadout, which was modeled as a volume source. Since downwash is not explicitly handled in AERMOD for volume sources, the accuracy of building parameters was not critical for model accuracy.

3.3.8 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." Ambient air is typically considered areas external to the identified property boundary where the facility is located, assuming that reasonable measures will be taken to preclude public access.

DEQ's non-site-specific analysis methods, using a generic facility layout, were used to generate minimum setback distances between emissions points and the property boundary or the established boundary to ambient air (if not the same as the property boundary). Compliance with applicable air quality standards and increments is not demonstrated unless setback distances are maintained.

3.3.9 Receptor Network

A polar grid with 10-meter receptor spacing extending out to 100 meters, 25-meter spacing extending out to 200 meters, 50-meter spacing extending out to 300 meters, and 100-meter spacing extending out to 400 meters was used in the non-site-specific modeling performed by DEQ. To establish a setback distance, the following procedure was followed for the requested production level and operational configuration:

1) Appropriate emissions rates were modeled to generate impact levels at all receptors.

2) For the operational configuration, pollutant, averaging period, and meteorological data set, all receptors with concentrations equal to or greater than the applicable standard or increment were plotted, effectively giving a plot of receptors where the standard could be exceeded for that pollutant and averaging period.

3) The controlling receptor for each pollutant, averaging period, and meteorological data set was identified. First, the receptor having a concentration exceeding the standard that was the furthest from the center of the facility was identified. The controlling receptor was the next furthest downwind receptor from that point.

4) The minimum required setback distance was calculated. This was the furthest distance between the center of the facility (the truck loadout source) and the controlling receptor.

Figure 1 shows an example (using criteria pollutants rather than TAPs) of how setback distances are determined for a specific modeling run. Emissions points are grouped in a cluster at the center within a 10-meter square area. The inner contour line shows the extent of modeled concentrations exceeding the 24-hour $PM_{2.5}$ NAAQS. The outer-most contour line shows modeled 1-hour NO_2 design value concentrations that exceed the NAAQS. The point on the contour line that is the furthest from the controlling source is identified, and then the controlling receptor is identified as the next furthest receptor beyond that point. The setback distance is determined from the coordinates of the controlling receptor.

3.3.10 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

$H = S + 1.5L$, where:

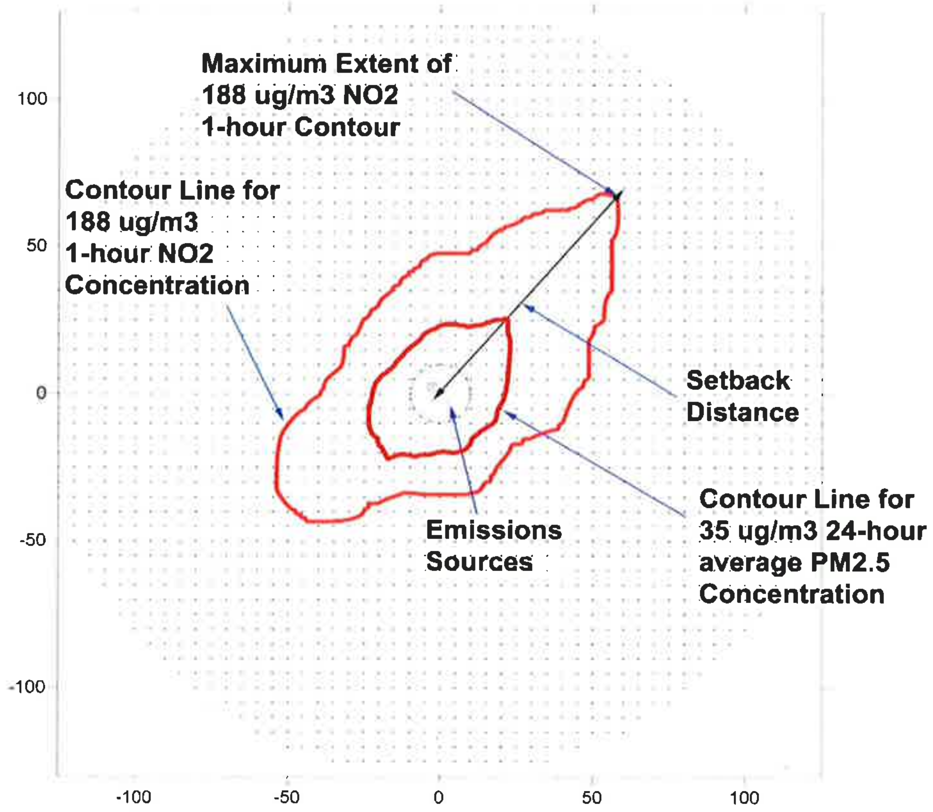
H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

All Feenstra CBP sources are below GEP stack height. Therefore, it is important to account for plume downwash caused by structures at the facility.

Figure 1 - Determination of Setback Distance for a Modeling Run



3.3.11 Crucial CBP Characteristics Affecting Air Quality Impacts

Table 7 lists characteristics of the CBP that are critical to the TAPs compliance demonstrations.

Table 7. IMPORTANT CHARACTERISTICS OF CBP USED IN DEQ ANALYSES	
Parameter	**Value or Description**
Concrete Production Rates	30,000 ton/year
Truck Loadout	Emissions will be controlled by a shroud or boot.
Generator	A fossil fuel fired generator was not used in the analysis. The analyses would require modification to allow the use of a generator at the site.
Seasonal Restriction	None were assessed.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

A NAAQS analysis was not performed for the Feenstra CBP facility. Idaho Air Rules Section 203.02, requiring air impact analyses demonstrating compliance with NAAQS, is not applicable to pollutants having a project-emissions increase that is less than BRC levels, provided the project would have qualified for a BRC permitting exemption except for the emissions levels of another criteria pollutant exceeding the ton/year BRC threshold.

4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with facility-wide emissions exceeding emissions screening levels (ELs). DEQ determined required setback distances from the non-site-specific modeling results for each TAP with emissions exceeding the EL and for each meteorological data set identified in Section 3.3.4. Table 8 lists controlling setback distances for each TAP and meteorological dataset. Setback distances are the closest allowable distance between the property boundary and the center of the facility, which is taken to be the truck loadout location.

Table 8. SETBACK DISTANCES AS A FUNCTION OF TAP AND METEOROLOGICAL DATASET

Meteorological Dataset	Setback Distance in meters[a]	
	Arsenic	Chromium^{6+}
Rexburg	80 (262)	125 (410)
Idaho Falls	60 (197)	90 (295)
Burley	40 (131)	60 (197)
Boise	50 (164)	70 (230)
Lewiston (airport)	NA[b]	70 (230)
Twin Falls	NA[b]	50 (164)
Sandpoint	NA[b]	70 (230)
Pocatello	NA[b]	60 (197)
Pullman/Moscow	NA[b]	125 (410)
Jerome	NA[b]	40 (131)
Aberdeen	NA[b]	60 (197)
Lewiston (clearwater site)	NA[b]	80 (262)
Coeur d'Alene	NA[b]	50 (164)

[a] Setback in meters. Value in parentheses are in feet.

[b] Not assessed because previous results show that Chromium^{6+} is the controlling TAP.

5.0 Conclusions

The information submitted with the PTC application, combined with DEQ air impact analyses, demonstrated to DEQ's satisfaction that emissions from the Feenstra CBP facility will not cause or significantly contribute to a violation of any ambient air quality standard.

References

1. *Policy on NAAQS Compliance Demonstration Requirements.* Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

2. *User's Guide for the AMS/EPA Regulatory Model – AERMOD.* U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division. EPA-454/B-03-001. September 2004. (Section 3.3.2.2)

3. *State of Idaho Guideline for Performing Air Quality Impact Analyses.* Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.